SFD Report

Katihar

India

Final Report

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SFD Promotion Initiative

sustainable sanitation alliance

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of Federal Ministry for Economic Cooperation and Development

UNIVERSITY OF LEEDS

WORLD BANK GROUP Water

GWSP GLOBAL WATER SECURITY & SANITATION PARTNERSHIP

WEDC

Loughborough University

CSE

eawag aquatic research

Sandec Sanitation, Water and Solid Waste for Development

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SFD Report Katihar, India, 2017

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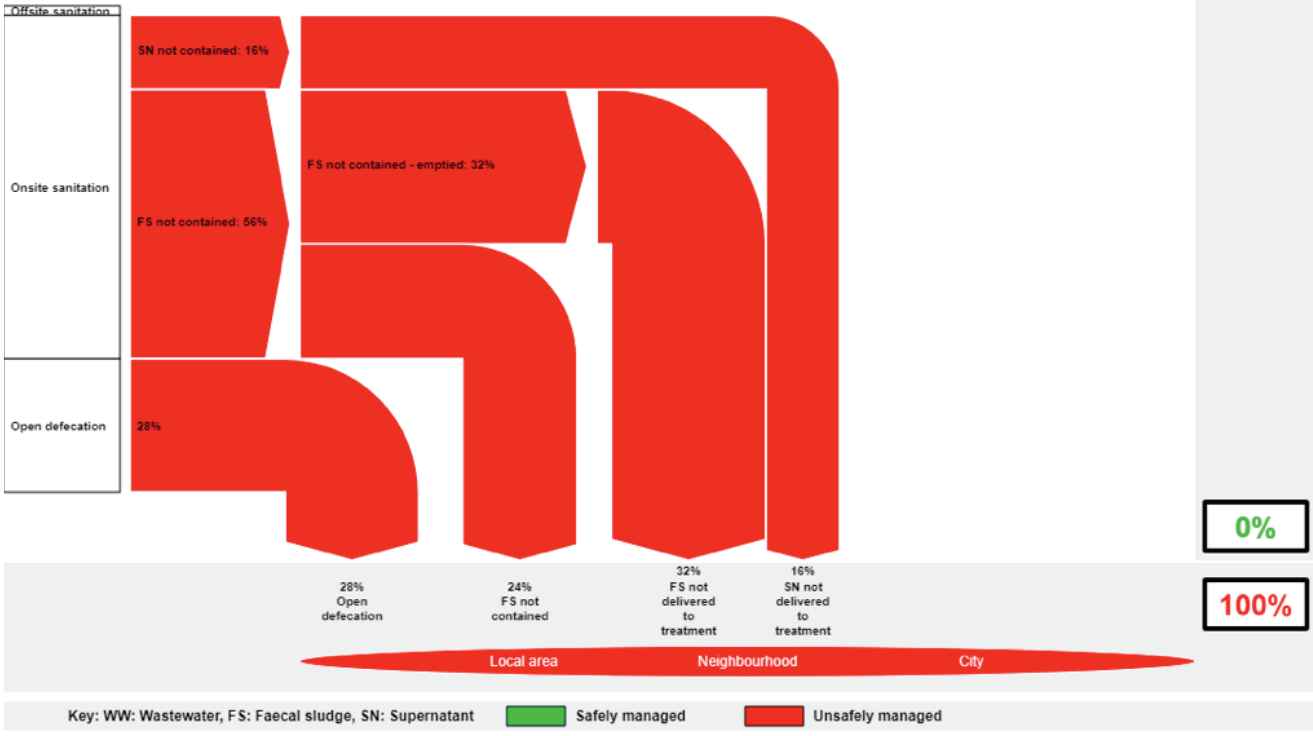
1. The SFD Graphic

Katihar, Bihar, India
Version: Draft
SFD Level: 3 - Comprehensive SFD

Date prepared: 6 Dec 2016
Prepared by: CSE



The SFD Promotion Initiative recommends preparation of a report on the city context, the analysis carried out and data sources used to produce this graphic.
Full details on how to create an SFD Report are available at: sfd.susana.org

2. Diagram information

SFD Level:
Comprehensive

Produced by:
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3. General city information

Katihar, the district headquarters of Katihar District, is located in the state of Bihar, India. Katihar district is situated in the plains of north eastern Bihar. The competitive advantage of Katihar lies in its good rail and road connectivity with the surrounding region and also other parts of the country (NIC, 2016).

The population of Katihar city is 240,838 with a population density of 9,437 persons per sq.km, which is quite high as compared to a population density of Bihar state i.e. 1,106 persons per sq.km (Census, 2011). During the post-independence period, commerce showed a phenomenal increase with the associated small scale industrial development, which resulted in the increase of city population. Katihar town covers an area of 33.46 sq.km and is divided into 45 wards.

As per Census of India, 2011, approximately 18% of the total population reside in slums which aggregate to 36,389 people. The climate in Katihar is warm and temperate. The average annual temperature is 24.9 °C. The average annual rainfall is 1,281 mm.

4. Service outcome

Overview on technologies and methods used for different sanitation systems through the sanitation service chain in Katihar is as follows:

Containment: Septic tank with effluent discharging to open drains or soak pit is the most common type of containment system within the central wards of the city. According to key informant interview (KII) with the city's sanitary inspector, the ratio of effluent discharging to open drain and soak pits is equal.

Lower income settlements like slums and squatter settlements have pit latrines constructed using concrete rings generally with honey comb structures (measuring 0.9 m in diameter and 0.2 m in depth). The people residing in peripheral areas generally practice open defecation due to inaccessibility of toilets.

Most of the septic tanks were found to be well designed with three chambers along with outlet. Septic tanks were common in markets and institutional establishments; the outlet was connected to open drain. Septic tank connected to soak pit/open drain aggregates to be 44%, unlined pit with no overflow is 28%. Open defecation is prevalent among 28% of the population.

Emptying: The emptying service is only provided by the municipal corporation (local governing body), and there are no private players in this business. Emptying service is only provided to the people who pay land holding tax. Tax is also applicable on agricultural lands. The corporation owns three vacuum tankers, two of which have 3,000 litres capacity and one has 9,000 litres capacity, all the vehicles are assembled at Kam-Avida, Pune and cost around INR 10 lakh (15,150 USD) per unit. In order to avail the service, the residents have to submit an application to the in-charge of the sanitary department and attach a copy of the holding tax along with it. But it was also observed that around 50% trips were off the records as the higher authorities and influential people directly contacted the sanitary inspectors to avail the service.

Figure 1: Discharge of faecal sludge at solid waste disposal site (Source: Anil/CSE, 2016)

A record is maintained on daily basis by the sanitary department. Usually, a driver is accompanied by two labourers for cleaning a tank; and it takes 10-15 minutes to clean a 3,000 litres capacity of tank, depending on the density of sludge. The corporation charges INR 750 (11.3 USD) and INR 2500 (37.8 USD) per trip for the 3,000 litres and 9,000 litres capacity vacuum tankers respectively and pays monthly remuneration of INR 7,700 (116.6 USD) to the driver and INR 7,000 (106 USD) to the labour. Emptying process is done without using any personal protective equipment. Manual scavenging is practised in households in narrow lanes where the vacuum tankers are inaccessible. Generally, people considered from lower caste and community are the workers who engage in manual scavenging.

Transport: The vehicle used for emptying containment systems is tractor mounted vacuum tanker. The emptiers are able to do three to four trips per day for which they cover a distance of 12 to 15 km per emptying cycle and the monthly maintenance of the tankers cost INR 5,000 (75.7 USD) to the corporation. The suction pump is used to create a vacuum, it has the capacity to pump septage from a distance of 70 m.

Treatment and disposal: There is no treatment facility for WW and Faecal Sludge (FS). WW from 15 wards conveyed via major storm water drains ends up in low lying areas. FS collected is discharged in solid waste dump yard in outskirts of the city.

According to the Census of India, 2011, Focus Group Discussion (FGD) and KII, 72% of the city is dependent on onsite systems but there is no sewerage network existing in the city (KMC, 2016). Out of 72% OSS, 44% are dependent on septic tanks connected to soak pits or open drains and around 28% on pits. According to survey and KII conducted in 2016, public latrines are connected to septic tanks, hence have been incorporated in onsite systems. Septic tanks are not contained as they are connected to open drains and since the groundwater level is lower than 10mbgl (CGWB, 2014), the pits are also not contained.

There is no clear differentiation between the volume of effluent and solid FS generated from septic tanks, hence to reduce the maximum error, it's assumed to be 50% each. Therefore, 15% of FS is assumed to be effluent/supernatant that goes into open drains and rest of FS is emptied from tanks whenever full. 25% of FS is not contained and not

emptied as 21% of FS gets infiltrated and 4% is estimated to be left in tanks. Whereas 32% of FS is emptied and not delivered to any treatment facility. It was estimated that 28% of the city still practices open defecation, which was also cross-checked based on field research.

5. Service delivery context

National Urban Sanitation Policy (NUSP) was issued in 2008, by the Ministry of Housing and Urban Affairs (MoHUA, GoI), formerly known as Ministry of Urban Development. The policy aims to: raise awareness, promote behaviour change; achieve open defecation free cities; develop citywide sanitation plans; and provide 100% safe confinement, transport, treatment and disposal of human excreta and liquid wastes. The NUSP mandates states to develop state urban sanitation strategies and work with cities to develop City Sanitation Plans (CSPs).

NUSP identifies the constitution of multi- stakeholder task force, known as city sanitation taskforce (CSTF) as one of the principal activities to be taken up to start the city sanitation planning process. CSTF has now been renamed as Swachh Bharat City Level Task Force (SBCLTF) (MoUD, 2014).

The Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Act, 1974 have provisions relating to sanitation services and environmental regulations. It applies to households and cities with regard to disposing wastes into the environment. Urban Local Bodies (ULBs)/ utilities also have to comply with discharge norms for effluent released from sewage treatment plants and to pay water cess under the Water Cess Act, 1977 (MoUD, 2013).

In February 2017, MoHUA issued the National Policy on Faecal Sludge and Septage Management (FSSM). The policy aims to set the context, priorities, and direction for, and to facilitate, nationwide implementation of FSSM services in all ULBs such that safe and sustainable sanitation becomes a reality for all in each and every household, street, town and city in India (MoUD, 2017).

There are various schemes like Swachh Bharat Mission (SBM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT) etc. launched by the central government to provide basic civic amenities including improvement of urban sanitation. Katihar city is one of the 500 AMRUT cities, and hence has a provision to get funds for faecal sludge and sewage management. Funds for construction of toilets lined drains and treatment plants can be accessed from NMCG (National Mission for Clean Ganga), Saat Nischay Yojna (seven resolves) and SBM. These schemes provide funds for various other infrastructure developments in sanitation as well.

The rapid assessment of FSM in city was done by Katihar Municipal Corporation (KMC) to calculate the funds required for the same. It was estimated that INR 2.3 billion (34.8 million USD approx.) is required for implementation of effective faecal sludge and septage management including operation and maintenance for five years.

6. Overview of stakeholders

The 74th Constitutional Amendment Act of 1992 reformed the sector by transferring responsibility for domestic, industrial, and commercial water supply and sewerage (WSS) from state agencies, such as Departments of Public Health Engineering and State Water Boards, to Urban Local Bodies (ULBs). This transfer has resulted in a variety of implementation models, as well as lack of clarity in the allocation of roles and responsibilities between state and local agencies, which sometimes results in large gaps in implementation (USAID, 2010). The following stakeholders are responsible for sanitation service delivery in Katihar.

Table 1: Key stakeholders (Source: Compiled by CSE, 2017)

Key Stakeholders	Institutions/organizations
Public institutions	Ministry of Housing and Urban Affairs (MoHUA), Public health and Engineering Department, Urban Development & Housing Department, Bihar, Reform Support Unit (RSU), Health & Sanitation Department, Katihar Municipal Corporation (KMC), Water Resource Department (WRD), Government of Bihar, Bihar Raj Jal Parishad (BRJP), Bihar Urban Infrastructure Development Corporation (BUIDCo), State Programme Management Group (SPMG)
NGOs	Sulabh International Social Service organization (SISSO), Centre for Science and Environment (CSE)
Private Sector	Local masons
Development Partners, Donors	Department for International Development (DFID)

PHED is responsible for ensuring access to safe water; supply of drinking water to rural areas and development of sanitation facilities, UD&HD performs implementation of schemes supported by the center and state government, KMC is responsible for provision and maintenance of basic services of the city such as water supply, drainage, solid waste management, tax collection, plan approvals., WRD is responsible for the development of drainage channels to be used for irrigation purposes, BUIDCO is mandated to execute and accelerate urban infrastructure projects in the

state. SISSO is responsible for operation and maintenance of public toilets. SPMG coordinates and oversees the implementation of projects sanctioned by Government of India under National Ganga Council (NGC).

SBCLTF is a multi-stakeholder platform comprising representatives from different sectors of society, including agencies directly responsible for sanitation, agencies indirectly involved or impacted, eminent persons, practitioners, media representative, NGOs and sanitary workers.

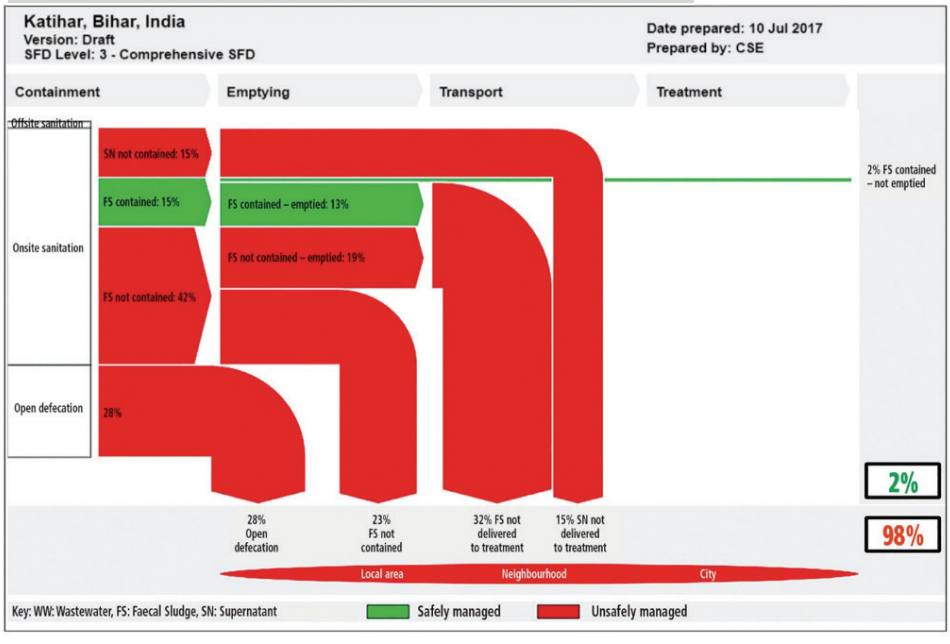
7. Description of Context-adapted SFD

As mentioned in section 4, 72% of the population is dependent on onsite sanitation systems. Out of 72% of the population, 30% of the population is dependent on septic tanks connected to open drain or storm sewer. 14% of the population is dependent on septic tanks connected to soak pit. 28% of the population, dependent on unlined pit with no outlet or overflow, is attributed to be FS not contained. With an earlier assumption of 50% of the proportion of the content of the septic tank is solid FS, generated and collected inside the septic tanks. Rest of the 50% of the content is supernatant, which attributes to 15% of the population that flows through open drains. According to SBCLTF the solid FS collected in the septic tank should be considered contained as it is neither polluting the ground water nor the solid excreta is overflowing in the open drain. Hence 15% of FS is considered contained (represented green in colour). 13% FS contained is emptied and remaining 2% FS remains in the tank which is contained and never emptied.

Nevertheless, the supernatant generated from septic tank connected to open drain is not contained and hence considered to be unsafely managed (represented red in colour).

The only difference suggested in the context adapted SFD is at containment stage for correctly designed septic tanks, though connected to open drains. Hence in the context adapted SFD 'FS not contained' changes from 56% to 42%, 'FS contained' changes from 0% to 15% and 'SN not contained' remains 16% when compared to SFD generated through graphic generator. Overall, excreta of 98% population is not managed safely according to the context adapted SFD.

8. Context-adapted SFD graphic



9. Process of SFD development

Data is collected through secondary sources. The city is visited to conduct the surveys, FGDs and KIIs with relevant stakeholders, to fill in the data gap and to cross-check the data collected. To start with, a relationship between sanitation technologies defined in Census of India and that defined in the project is established. The secondary data is quantified and cross-checked with FGDs and KIIs.

The data is fed into the SFD graphic generator to calculate the excreta flow in terms of percentage of the population and also produce the SFD graphic. It can be concluded that excreta of the whole population is discharged untreated into the environment. The latter SFD graphic of Katihar is not able to capture the correctly designed fully functional septic tanks as a contained system, as based on feedback from SBCLTF. Hence, a context adapted city specific SFD graphic is manually corrected to convey the substantial picture of the excreta management in the city.

10. Credibility of data

The Census of India, 2011, is one of the key source of data used. Most of the data is then updated by KIIs and FGDs. Overall, 4 KIIs and 4 FGDs were conducted with different stakeholders. There were three major challenges to develop the SFD. Census and published/unpublished reports were not able to provide (i) up-to-date data on containment (ii) detailed typology of containment and (iii) actual information about FSM services provided to households. For this reason, field based studies were conducted to validate the data provided by secondary sources.

The Census and published/unpublished reports mostly differentiate between systems connected to user interface, if any, but does not give information about the design of actual containment systems on ground level or about the disposal of septage and WW generated. Therefore, a random household survey was conducted in some wards of the city to identify and cross check the data collected from secondary sources.

The objective of the survey conducted was to obtain a more accurate measure of how excreta is managed through stages of sanitation service chain (from containment to end-use or disposal). For the validation of the SFD prepared for the city, the graphic (refer section 1) was presented in SBCLTF meeting. Based on their feedback a context adapted SFD is prepared.

The Census and published/unpublished reports mostly differentiate between systems connected to the user interface, if any, but does not give information about the design of actual containment systems on ground level or about the disposal of septage and waste water generated. Therefore, a random household survey was conducted in each ward of the city to identify and cross check the data collected from the secondary sources.

The objective of the survey conducted was to obtain a more accurate measure of how excreta is managed through stages of sanitation service chain (from containment to end-use or disposal).

For the validation of the SFD prepared for the city, the diagram was presented in a SBCLTF meeting. The SBCLTF's members have validated the collected data and the final SFD graphic.

11. List of data sources

Below is the list of data sources used for the development of SFD.

- Published/unpublished reports and books
  - Census of India 2011, House listing and housing data, Government of India
  - City Sanitation Plan, UD&HD, 2013
  - National Policy on Faecal Sludge and Septage management, MoUD, 2017
  - City Development Plan, 2010, Katihar
- KIIs with representatives from
  - Government agencies: KMC
  - Service providers: SISSO
  - Ward councilors
  - Slum representatives
- FGDs
  - KMC officials
  - Ward councilors
  - Shopkeepers in markets
  - SBCLTF
- Random household survey

Katihar, India, 2017

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Abbreviations

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BIS	Bureau of Indian Standard
CAPEX	Capital expenditure
CPHEEO	Central Public Health and Environmental Engineering Organization
CDP	City Development Plan
CSE	Centre for Science and Environment
CSP	City Sanitation Plan
CSTF	City Sanitation Task Force
CT	Community Toilet
FGD	Focus Group Discussion
FS	Faecal Sludge
FSM	Faecal Sludge Management
FSSM	Faecal Sludge & Septage Management
GoI	Government of India
HFA	Housing for All
HH	Households
IHSDP	Integrated Housing and Slum Development Programme
INR	Indian Rupee
IS	Indian Standards
JE	Junior Engineer
Km	Kilometer
KMC	Katihar Municipal Corporation
KII	Key Informant Interview
LBD	Length, Breadth and Depth
Lpcd	Litres per capita per day
m	Meter
mm	Millimeter
mbgl	Metre below ground level
MLD	Million Litres per Day
MoHUA	Ministry of Housing and Urban Affairs (Formerly known as Ministry of Urban Development)
MoUD	Ministry of Urban Development
NBC	National Building Code
NFSSM	National Faecal Sludge and Septage Management Alliance
NH	National Highway
NITI	National Institution for Transforming India (Formerly known as Planning Commission)
NIUA	National Institute of Urban Affairs
NMCG	National Mission for Clean Ganga
NUSP	National Urban Sanitation Policy
OD	Open Defecation
O & M	Operation and Maintenance
OPEX	Operational expenditure
OSS	Onsite Sanitation System
PHED	Pubic Health and Engineering Department
PT	Public Toilet
RAY	Rajiv Awas Yojna
SBCLTF	Swachh Bharat City Level Task Force
SBM	Swachh Bharat Mission (Clean India Mission)
SFD	Shit Flow Diagram
SFCPoA	Slum Free City Plan of Action
SH	State Highway
SN	Supernatant
Sq.km	Square Kilometer
SLB	Service level Benchmark
SLIP	Service level Improvement Plan
SMP	Septage Management sub-Plan
SPS	Sewage Pumping Station
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TDS	Total Dissolved Solids
UD&HD	Urban Development & Housing Department
UIDSSMT	Urban Infrastructure Development for Small and Medium Towns
ULBs	Urban local bodies
USAID	United States Agency for International Development
USD	United States Dollar (1 USD = 66 INR)
WSS	Water Supply and Sewerage
WW	Wastewater

1 City context

Katihar town is the administrative headquarter and an important railway junction of the Katihar district. The competitive advantage of Katihar lies in its good rail and road connectivity with the surrounding region and also other parts of the country which gives it the potential to be developed as a logistic hub. The Katihar Junction railway station has five rail routes converging to Delhi, Kolkata, Guwahati, Dalkhola with many other cities. The prime reason for development of Katihar city is being the home for sub divisional office of North East Frontier Railway of the Indian Railways since 1889 (UD&HD, 2010).

The population of Katihar city is 240,838 with a population density of 9,437 persons per sq.km as per Census of India, 2011. It was 190,873 as per Census 2001 with a decadal growth rate of 26.18 per cent. During the post-independence period, commerce showed a phenomenal increase with the associated small scale industrial development, which resulted in the increase of city population. Refer to table below for growth rate pattern:

Table 1: Population growth rate

Census Year	Population	Growth rate (%)
1991	135,436	26.53
2001	190,873	23.65
2011	226,261	27

Source: Census of India, 2011

Katihar town covers an area of 33.46 sq.km and is divided into 45 wards. The city is located in the north eastern part of Bihar between the latitudes of 25.5520° N, 87.5719° E. Katihar is located 80 km west of Bangladesh and 100 km south of Nepal. It is surrounded by Purnea & Bhagalpur district of Bihar in the north and the west respectively, Sahebganj district (Jharkhand) in the south and Malda district and Uttar Dinajpur district (West Bengal) in the East. (NIC, 2016)

Katihar is located very close to the River Kosi that is well known for its floods. The city has undulating terrain that makes it prone to frequent water logging. The fact that development has been largely unplanned has had an adverse impact on the overall city environment. The poor state of services and infrastructure further deteriorates the environment and the quality of life of citizens. (UD&HD, 2010).

The climate in Katihar is warm and temperate. The average annual temperature is 24.9 °C. The average annual rainfall is 1281 mm.

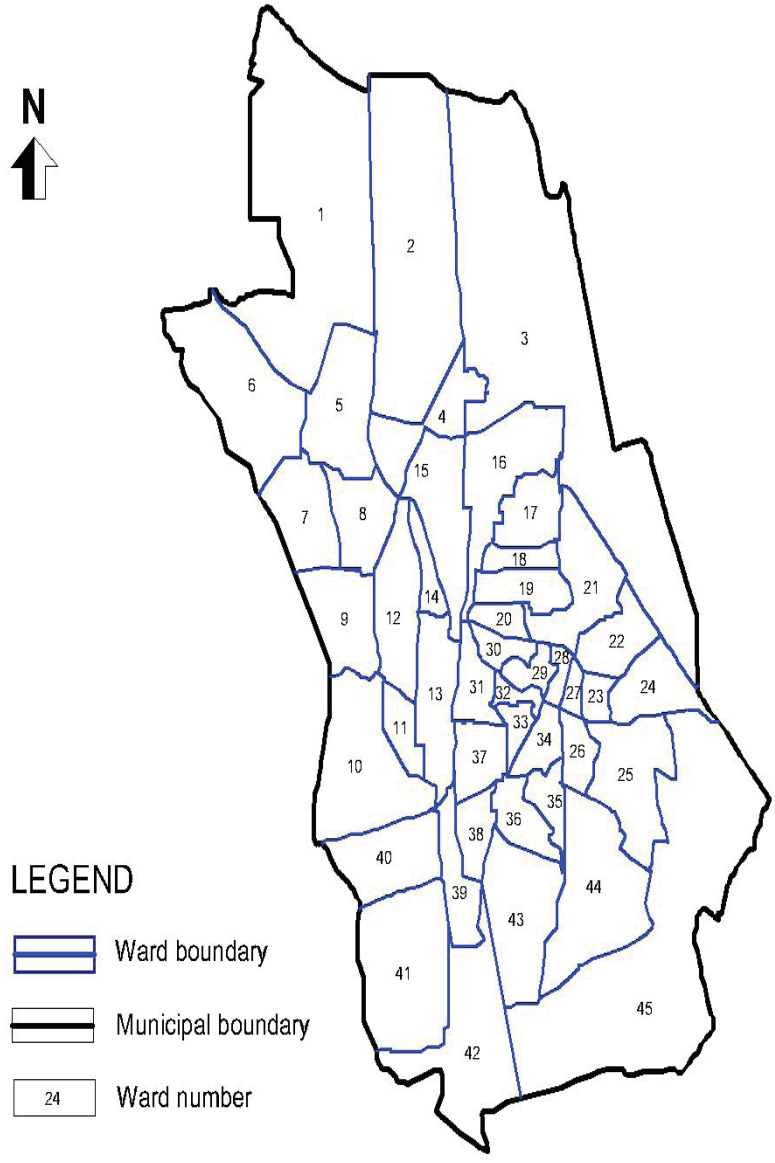

Figure 1: Ward map of Katihar (Source: CSE, 2016)

2 Service outcomes

The analysis is based on data available from Census of India, 2011, *Saat Nishchay Yojna,* CDP, CSP and sample household survey. Data collected from secondary sources is triangulated in field based study. Data has been cross-checked and updated by Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). According to the SFD promotion initiative (PI) definitions of sanitation systems, the types of containments prevalent in the wards are examined through household survey (for details refer to table 02). Data on emptying, transport, treatment and disposal of FS is collected through KIIs with Urban Local Body (ULB is the local governing body in a city responsible for providing basic infrastructures like water supply and sanitation along with health facilities as per standards and norms, to all the citizens, in Katihar, the ULB is called Katihar Municipal Corporation [KMC]), private emptiers and parastatal body. However, most of the data is qualitative.

2.1 Overview

To start with a relationship between sanitation technologies defined in Census of India and variables defined in the project is established. Then the population dependent on those systems is represented in terms of percentage of population, as shown in table 8

Table 2: Sanitation technologies and corresponding percentage of population

S. no.	Sanitation technologies and systems as defined by:		SFD Reference variable	Percentage of Population
	Census of India	Sanitation systems defined by SFD Promotion initiative		
1.	Piped sewer system	User interface discharges directly to centralized separate sewer	T1A1C6	4.5
2.	Septic tank	Septic tank connected to open drain or storm sewer	T1A2C6	52.4
3.	Other systems	User interface discharges directly to open ground	T1A1C8	4.8
4.	Pit latrine with slab	Lined pit with semi-permeable walls and open bottom, no outlet or overflow, general situation	T1A5C10	7
5.	Pit latrine without slab	Unlined pit no outlet or overflow, general situation	T1A6C10	1.9
6.	Night soil disposed into open drain	User interface discharges directly to open drain or storm drain	T1A1C6	0.5
7.	Service latrine	User interface discharges to “don’t know where”	T1A1C9	0.9
8.	Public latrine	Septic tank connected to open drain or storm sewer	T1A2C6	2.8
9.	Open defecation	Open defecation	T1B11C7 to C9	24.9

Source: Census of India, 2011

1.0.1 Sanitation facilities

This section presents on existing sanitation facilities in community/public toilets, institutions, commercial establishments and slums.

Community toilets: KMC is responsible for construction of community and public toilets within the city.

However, the operation and maintenance of these toilet complexes is not taken care by the corporation. Community toilets are the responsibility of the local people residing around community and there is no helping hand from KMC in such cases, whereas on the other hand, the public toilets are functional under public private partnership with the KMC and 6 other agencies. The containment systems are restricted to septic tanks connected to open drain or a soak pit. The containment systems of these are basically larger in size measuring 6.7 x 2.4 x 1.8 m (refer to Appendix 7.8 for details of community toilet/Public toilet).

Institutional and Commercial establishments: In Katihar, the commercial/market places are recorded during survey. The following are the details of such places.

Table 3: List of commercial places/markets in KMC

Sl. No.	Commercial places and markets	Nos.
1	Meat & fish market(Large)	49
2	Restaurants and eating houses	33
3	Hotels	33
4	Sweet shops	55
5	Road side market and vendors	200
6	Garages	21
7	Vehicles & repairing shops	83
8	Total no. of shops	416
9	Temple/ Kabristan	11

Source: UD&HD, 2010

In general, all these areas are devoid of adequate sanitation facilities. Large markets and shops do have individual toilets connected to septic tank with effluent discharging into open drains but in insanitary condition. In government bus stand and railway station, there are toilet facilities that suffer from poor operation and insanitary condition. The containment system of toilets in commercial places is not being considered for making SFD.

2.1.2 Containment

Figure 2: PT complex in Court compound in Mirchaibari (Source: Anil/CSE, 2016)

As per random household survey conducted in November 2016, the city has three different types of containment systems that vary on the basis of household income.

Septic tank with effluent discharging to open drain or soak pit is the most common type of containment system within the central wards of the city. According to KII with the city's sanitary inspector the ratio of supernatant discharging to open drain and soak pit is considered equal. Lower income settlements like slums and squatter settlements have pit latrines constructed using concrete rings measuring 0.9 m in diameter and 0.2 m in depth. The outer areas generally practice open defecation due to unavailability of toilets. Most of the septic tanks were found to be well designed with three separation chambers along with outlet. Nonresidential places like commercial, public and semi-public areas were found to have septic tank as containment systems with effluent discharging into open drain or soak pit. Following is the share of population dependent on type of containment systems:

Table 4: Types of containment systems prevalent

Containment type	Population dependency in percentage
Septic tank connected to soak pit	13
Septic tank connected to open drain	31
Unlined pit with no overflow	28
Open defecation	28

Source: Sample survey, 2016

2.1.3 Emptying

Figure 3: Septic tank in central area of the city (Source: Anshul/CSE, 2016)

Figure 4: Containment system in peripheral area of city (Source: Anil/CSE, 2016)

The emptying service is only provided by the Katihar municipal corporation, and there are no private players in this business. Emptying service is only provided to the people who pay land holding tax. Tax is also applicable on agricultural lands.

The corporation owns 3 vacuum tankers, two of which have 3,000 litres capacity and one has 9,000 litres capacity. All the vehicles are assembled at *Kam-Avida*, Pune and costs around INR1 million (15,151 USD) per unit. In order to avail the service, the residents have to submit an application to the in-charge of sanitary department and attach a copy of the holding tax along with it. But it was also observed that around 50% trips were off the records as the higher authorities and influential people directly contact the sanitary inspector and avail the service.

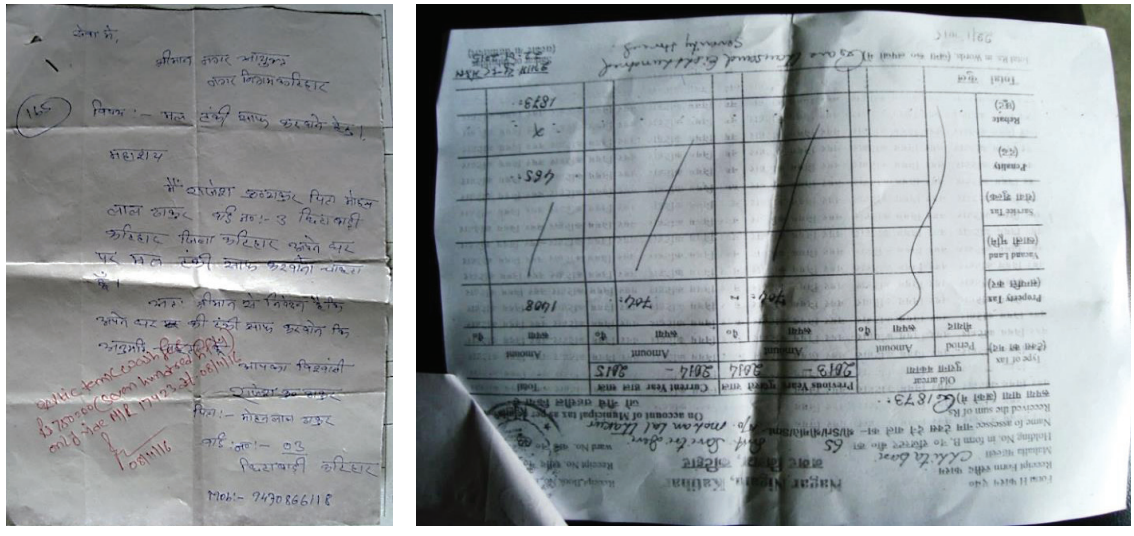

Figure 5: Application for desludging service attached with tax receipt (Source: Anshul/CSE, 2016)

A record is maintained on a daily basis by the sanitation department of KMC. Usually, a driver is accompanied by two labourers for cleaning a tank; and it takes 10-15 minutes to clean a tank of 3,000 litres capacity, depending on the level of solidification of FS in the containment. The corporation charges Rs.750 (11.3 USD) and Rs.2,500 (37.8 USD) per trip for the 3,000 litres and 9,000 litres capacity vacuum tankers respectively and pays monthly remuneration of Rs.7,700 (116.6 USD) to the driver and Rs.7,000 (106 USD) to the labourers. On an average, the emptiers make 2-3 trips per day and the monthly maintenance of the tankers cost Rs.5,000 (77.7 USD) to the corporation. Emptying process is done without using any personal protective equipment (PPE).

Manual scavenging is practised in households established in narrow lanes, where the vacuum tanker cannot get an access. Generally, people from lower caste community are the workers who engage in manual scavenging.

Figure 6: Emptying of soak pit containing supernatant from septic tank and grey water (Source: Anil/CSE, 2016)

Details of emptying service provided by the ULB are given below in table 5.

Table 5: Emptying service record maintained at KMC

Year	Amount received (In INR)	No of trips on records	No of trips off records	Total trips
2014-15	2,42,060 (3,640 USD)	322	150	472
2015-16	2,48,250 (3,733 USD)	331	150	481
2016- Nov 16	1,67,000 (2,511 USD)	223	100	323

Source: KMC, 2016

2.1.4 Transportation

The emptiers take about three to four trips per day for which they travel a distance of 12 to 13 km per emptying. The pump used to suck out the FS has a capacity to empty septage from a distance of 70 m. Two vaccum tankers of 3000 litres capacity are tractors mounted and a vacuum tanker of 9000 litres capacity is truck mounted. The supernatant generated from households have septic tank connected to open drains, carries effluent through lined open drains and discharges to low lying areas in the city. It is reported that there is no drains in ward no. 45, all households are dependent on pits (KMC, 2016b).

Figure 7: Tractor mounted tanker at KMC (Source: Anshul/CSE, 2016)

2.1.5 Treatment and disposal/end use

There is no treatment facility for WW and FS. The FS collected is discharged untreated.

Figure 8: WW being drained out to low lying areas in ward 45 (Source: Anil/CSE, 2016)

The FS collected by all the vacuum tankers is discharged in the insanitary solid waste landfill site located at ward no. 45. The site is designated by KMC to discharge FS. Supernatant/effluent generated from 15 wards of the city is disposed in the low lying area of ward no.15, remaining supernatant generated from 30 wards are disposed in and around the city at multiple low lying areas.

Figure 9: WW settled in low lying areas in ward 22 and FS discharged at landfill site (Source: Anil/CSE, 2016)

2.2 SFD matrix

The SFD for Katihar is presented in Appendix 7.3

2.2.1 *SFD matrix explanation*

According to Census of India 2011, FGDs & KIIs, it is concluded that the city does not have underground drainage network and is dependent on three different types of OSS. The result of analysis concluded that 28% of the population has no access to toilets and hence defecated in open. Whereas, rest of 72% of the population have different OSS.

The 2011 Census reveals around 62% of the population is dependent on OSS out of which 52% are based on septic tanks and 10% based on pits. But according to random HHs survey in 40 wards and KIIs with local masons it is estimated that around 14% of population has septic tanks connected to a soak pits, 30% has septic tanks with outlet connected to open drains, 28% has unlined pits with no outlet and overflow.

Table 6: Containment systems and corresponding percentage of population

S.no.	SFD reference variable	Description (city context)	Percentage of population
1	T2A2C5	Septic tank Connected to soak pit where there is significant risk of ground water pollution	13
2	T1A2C6	Septic connected to open drain or storm water drain	31
3	T2A6C10	Unlined pit with no outlet or overflow where there is significant risk of ground water pollution	28
4	T1B11 C7 TO C9	Open defecation	28

Source: CSE, 2017

Table 7: Description of terminologies used in SFD

System type	Variables	Description (city context)	Percentage of population
Onsite	SN not contained	Supernatant from the onsite sanitation technology (T1A2C6), where the effluent is conveyed through open drain	15
	SN not delivered to treatment	Supernatant from the onsite sanitation technology (T1A2C6) discharged into open drains and lands at low lying areas	15
	FS not contained	FS from the onsite sanitation technology (T1A2C5, T1A2C6 and T2A5C10), is not contained due to infiltration polluting ground water and SN getting discharged into open drains.	57
	FS not contained not emptied	FS not contained and not emptied represents the infiltration from T2A6C10 and leftover FS in T1A2C5, T1A2C8	25
	FS not contained – emptied	FS emptied from the onsite sanitation technology (T1A2C5, T1A2C6 and T2A6C10) using either motorized equipment or manual emptying	32
	FS not delivered to treatment	Emptied FS, i.e. transported to solid waste dump yard and does not undergo any treatment	32
Open defecation	Open defecation	With no user interface, users defecate in water bodies or on open ground; consequently, the excreta is not contained.	28

Source: CSE, 2017

Offsite: According to Census of India piped sewer network is 4.5%, but according to field survey and FGD with city officials it was concluded that there is no existing sewerage network (KMC, 2016). In the SFD, therefore, it is considered to be non-existent.

Onsite: The SFD graphic represents that 72% population is dependent on onsite systems which are of three types as explained before. There is no clear differentiation between the volume of effluent and septage generated from tanks, hence to reduce the maximum error it is assumed to be 50 % each, which is further rounded off by the tool. Therefore, it is estimated that the effluent or SN generated from septic tank connected to open drain would be around 15% and the other 16% would be FS.

FS from T2A2C5, T1A2C6 & T2A6C10 sums up to 57% which is not contained (due to infiltration from unlined pits and SN from ST to open drains). Total FS includes 16% from septic tank connected to open drain, 13% from septic tank connected to soak pit and 28 % from the pits. The infiltrate is assumed to 50% of FS hence 21% (out of 41%, as there will be no infiltrate from ST connected to open drain) would infiltrate down the ground. It is also assumed that 90% people dependent on OSS use their systems with emptying therefore only 32% of FS is emptied and not delivered to any treatment facility, whereas 4% of FS remains in tank. Therefore, the total FS not contained and not emptied comes out to be 25 % (21% infiltrate and 4% FS that remains in the tanks and pits). Overall the excreta of the whole city is not managed safely and hence pollutes the environment.

Open Defecation: 28% population still practice open defecation.

2.2.2 *Risk of groundwater contamination*

The SFD assessment includes the risk of groundwater pollution as an important factor in determining whether excreta is contained or not contained. If the risk of contamination to groundwater is low then FS is considered “contained”. The type of onsite sanitation technology in use also has an influence on the infiltration of liquid into the groundwater and therefore on the potential risk of groundwater pollution.

The city has no pipe water supply and is entirely dependent on ground water (KMC, 2016). It was also reported that the ground water contains a fair amount of iron which increases with the increase in depth and is not fit for drinking purpose. The rudimentary water purifier is commonly used to deal with the problem. However, the low-income areas are still consuming the contaminated water. Most of the HHs have community or individual hand pump or submersible water pump installed to pump water. Bottled water is now becoming the major source for drinking purposes.

Figure 10: Ground water dependence and purification of water (Source: Anshul/CSE, 2016)

2.2.3. Discussion of certainty/uncertainty levels of associated data

There were three major challenges to develop the SFD. Published/unpublished reports were not able to provide completely (i) up-to- date data on containment (ii) detailed typology of containment and (iii) actual information about FSM services provided to households. For this reason, field based studies were conducted to validate the data and triangulation of data provided by secondary sources.

The Census mostly differentiate between systems connected to user interface, if any, but does not give information about the design of actual containment systems on ground level or about the disposal of septage and WW generated. Therefore, random household survey was conducted in each ward of the city to identify and cross check the data collected from the Census of India, 2011.

CSE's representatives have conducted the KIIs, FGDs and primary surveys.

The assumption regarding the volume of FS emptied as compared to FS generated has a high impact on the overall SFD. A reliable method for estimating quantities of FS generated on a citywide scale do not yet exist, and it is complicated because the containment size and emptying period greatly vary. The volume of FS emptied is not clear as many trips don't get recorded due to corruption issues. Since there is no clear differentiation between the volume of effluent/supernatant and septage generated from septic tanks and lined tanks, hence it's assumed to be 50% each. Based on the survey, it is assumed that respondents getting their OSS emptied within 10 years are using their systems with emptying and respondents getting their OSS emptied after 10 years are using their system without emptying. In the matrix, it is assumed that 90% of the population get their containment systems emptied when full.

The objective of the survey conducted was to obtain a more accurate measure of how excreta is managed through stages of sanitation service chain (from containment to end-use or disposal). To reduce the uncertainty around the data collected, the draft SFD was prepared based on the analysis done and was presented to the SBCLTF's members and they validated the graphic and the report.

2.3 Context adapted SFD

According to the SBCLTF, SFD generated by the graphic generator is not sufficiently visualizing the actual situation at containment stage of sanitation chain. According to the stakeholders the properly designed septic tanks, which are regularly emptied, should be considered contained even if the supernatant is discharged into open drains. Hence, a context adapted city specific SFD graphic is manually corrected to convey the true picture of the excreta management in the city.

Kindly refer to Appendix 7.5 for the context adapted SFD graphic. There is no major change done in the graphic. The only difference suggested in this context is at containment stage, i.e. for correctly designed septic tanks. Out of 72% of the population, dependent on onsite sanitation system, 30% of the population is dependent on septic tanks connected to open drain or storm sewer. 14% of the population is dependent on septic tanks connected to soak pit. 28% of the population, dependent on unlined pit without outlet or overflow, is attributed to be FS not contained.

With an earlier assumption of 50% of the proportion of the content of the septic tank is solid FS, rest of the 50% is assumed to be supernatant, which attributes to 15% of the population, that flows through open drains. According to SBCLTF the solid FS collected in the septic tank (attributed to 15% population) should be considered contained as it is neither polluting the ground water nor the solid excreta is overflowing in the open drain. Hence 15% of FS is considered contained (represented green in color). 13% FS contained

is emptied and rest 2% FS remains in the tank which is contained and never emptied. Nevertheless, the supernatant generated from septic tank connected to open drain is not contained and hence considered to be unsafely managed (represented red in colour).

The only difference suggested in the context adapted SFD is at containment stage for correctly designed septic tanks, though connected to open drains. Hence in the context adapted SFD, the 'FS not contained' changes from 56% to 42%, 'FS contained' changes from 0% to 15% and 'SN not contained' remains 16% when compared to SFD generated through graphic generator.

Overall, excreta of 98% population is not managed safely according to the context adapted SFD as compared to 100% not managed according to graphic generator. The graphic is well received by the stakeholder's group and city's authority has agreed that the context adapted SFD graphic is representing much closer picture to the ground conditions.

3 Service delivery context description

3.1 Policy, legislation and regulation

3.1.1 *Policies, legislations and regulations at national level*

In 2008, the Ministry of Housing and Urban Affairs (MoHUA) (formerly known as MoUD) issued the National Urban Sanitation Policy (NUSP). The policy aims to: raise awareness, promote behavior change; achieve open defecation free cities; develop citywide sanitation plans; and provide 100% safe confinement, transport, treatment and disposal of human excreta and liquid wastes. The NUSP mandates states to develop state urban sanitation strategies and work with cities to develop City Sanitation Plans (CSPs). NUSP specifically highlights the importance of safe and hygienic facilities with proper disposal and treatment of sludge from on-site installations (septic tanks, pit latrines, etc.) and proper operation and maintenance (O&M) of all sanitary facilities. Furthermore, it explicitly states that cities and states must issue policies and technical solutions that address on-site sanitation, including the safe confinement of faecal sludge (FS) (USAID, 2010). The objectives of NUSP are to be realized through CSPs and state sanitation strategies. NUSP identifies the constitution of multi-stakeholder task force as one of the principal activities to be taken up to start the city sanitation planning process. As per the requirement of CSP, a major role is to be played by the members of institutions, organizations, individuals, NGOs, academics, media representatives, local councillors, industry owners, consultants, representatives of private sector, etc. Constitution of Swachh Bharat City Level Task Force (SBCLTF) formerly known as City Sanitation Task Force (CSTF) is facilitated by drawing members from these groups in consensus with citizens who will be constantly supporting the CSP preparation by analyzing the strengths and competencies required to overcome the current situation and for better sanitation facilities (MoUD, 2014).

The advisory note on septage management in urban India, issued by MoUD in 2013, recommends supplementing CSPs with a Septage Management Sub-Plan (SMP) be prepared and implemented by cities. Septage refers here broadly to not only faecal sludge removed from septic tanks but also that removed from pit latrines and similar on-site toilets. This advisory provides references to the Central Public Health and Environmental Engineering Organization (CPHEEO) guidelines, Bureau of Indian Standard (BIS) standards, and other resources that users of this advisory may refer for details while preparing their SMP (MoUD, 2013). It clearly discusses on techno- managerial and socio- economic aspects of Septage management in India and provides guidelines for Urban Local Bodies to (ULBs) to plan and implement SMP.

The Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Act, 1974 have provisions relating to sanitation services and environmental regulations. It applies to households and cities with regard to disposing wastes into the environment. ULBs/ utilities also have to comply with discharge norms for effluent released from sewage treatment plants and to pay water cess under the Water Cess Act, 1977. The ULB is responsible for ensuring the safe handling and disposal of septage generated within its boundaries, for complying with the Water Act and for meeting all state permit requirements and regulations (CSE, 2010). Municipal acts and regulations usually refer to management of solid and liquid wastes but may not provide detailed rules for septage management (MoUD, 2013).

The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act is enacted in 2013. This act prohibits employment of manual scavengers and insanitary latrines - Laying strong emphasis on rehabilitation of manual scavengers. The broad objectives of the act are to eliminate insanitary latrines, prohibit the employment of manual scavengers and the hazardous manual cleaning of sewer and septic tanks, and to maintain a survey of manual scavengers and their rehabilitation (MoSJE, 2014).

In February 2017, MoUD issued the National Policy on Faecal Sludge and Septage Management (FSSM). The policy aims to set the context, priorities, and direction for, and to facilitate, nationwide implementation of FSSM services in all ULBs such that safe and sustainable sanitation becomes a reality for all in each and every household, street, town and city in India (MoUD, 2017).

The Fourteenth Finance Commission (FC-XIV) was constituted by the President of India under Article 280 of the Constitution on 2 January 2013 to make recommendations for the period 2015-20. Its assignments include distribution of revenue between union and state; devising formula for grant; suggesting method to augment resources for local bodies; and taking care of any matter referred to it (NIUA, 2015).

Model Municipal Building Bye-laws 2016 prepared by Town and Country Planning Organization (TCPO). Building bye-laws 2016 is used to regulate coverage, height, building bulk, and architectural design and construction aspects of buildings so as to achieve orderly development of an area. They are mandatory in nature and serve to protect buildings against fire, earthquake, noise, structural failures and other hazards. It includes chapters on green buildings and sustainability provisions, rainwater harvesting, wastewater (WW) reuse and recycle, installation of solar roof top photo voltaic norms, revised norms for adequate toilet facilities for women and public conveniences in public buildings and mandatory provisions for segregated toilet facilities for visitors in public buildings (TCPO, 2016).

3.1.2 Policies, legislations and regulations at state and ULB level

According to the Constitution of India, water and sanitation are state subjects. Statutory powers are conferred to the state for making laws on water and sanitation. Some of the policies, laws and regulations are listed below:

The state has prepared a draft urban sanitation strategy which construes upon the overall framework of the NUSP. The objective of the strategy is to encourage cities to prevent open defecation, provide potable water in adequate quantity and safely manage waste water thereby prioritizing sanitation and developing individual action plans suited to local conditions. The strategy aims at motivating the ULBs for planning, execution and operation and maintenance of all works related to water supply, sewerage, solid waste management and sanitation works; henceforth promoting a healthy competition amongst the ULBs by awarding the best performing ULBs. The strategy promotes ULBs to ensure effective disposal of WW from all toilets by aiming for 100% sewerage system with the treatment of sludge before disposal. The state intends to consolidate all plans under the City Sanitation Plan.

Bihar Municipal Act, 2007: The Bihar Municipal Act frames the responsibilities of the ULBs in the state of Bihar towards sanitation, but there is no specific responsibility towards the management of onsite sanitation system.

Bihar Building Bye-laws, 2014: The Bihar municipal Act, 2007 and section – 81 (2)(w) of the Bihar Urban Planning and Development Act, 2012, the Government of Bihar notified the Bihar Building Bye-laws 2014, which is enforced to all the municipal areas of the state. Bye-law highlights the specification for construction of any building. As per the bye-laws, the building plan will only be approved if the plan includes a septic tank in the design. If anyone is found to have approved building plan in deviation of building bye-laws shall be liable to be prosecuted and shall be liable to pay fine of rupees fifty thousand or sentence to imprisonment for a period which may extend to one year or both (BBBL, 2014).

The 5th State Finance Commission of Bihar is a committee pertaining to the state of Bihar, established with a purpose of reviewing the financial implementations of the state. It is constituted by the State Government under clause (1) of Article 243-1 and clause (1) of Article 243-Y of the Constitution of India, along with the provisions of the Bihar Panchayat Raj Amendment Act, 2011 (SFCB, 2014).

3.1.3 Institutional roles

The MoUD is the nodal ministry for policy formulation and guidance for the urban water supply and sewerage sector. The ministry's responsibilities include broad policy formulation, institutional and legal frameworks, setting standards and norms, monitoring, promotion of new strategies, coordination and support to State Programmes through institutional expertise and finance. The ministry is also responsible for managing international sources of finance. The Central Public Health and Environmental Engineering Organisation (CPHEEO), created in 1953, is the technical wing of the MoUD, which advises the ministry on all technical matters and collaborates with the State Agencies about water supply and sanitation activities. CPHEEO plays a critical role in externally funded and special programmes. CPHEEO also plays a central role in setting design standards and norm setting for urban water supply and sanitation (Planning Commission, 2002).

National Council for Rejuvenation, Protection and Management of River Ganga referred as National Ganga Council formerly known as National Ganga River Basin Authority (NGRBA), was constituted under the

Table 8: Roles and responsibilities

Institution	Roles and responsibilities
Public Health and Engineering Department, Bihar (PHED)	Ensuring access to safe water; supply of drinking water to rural areas and development of sanitation facilities; constant monitoring of quality of drinking water supply; ensuring participation of communities in schemes involving drinking water supply and sanitation; reforming water supply and sanitation sector.
Urban Development & Housing Department, Bihar (UDHD)	Implementation of schemes supported by the centre and state government respectively, such as the National Mission for Clean Ganga & *Saat Nischay Yojna*.
Reform Support Unit (RSU)	Execute/implement the projects supported by DFID in the state of Bihar. To assist PHED in the field of water supply and sanitation
Water Resource Department, Government of Bihar (WORD)	Administrative control of all four Command Area Development Agencies viz *Sone, Kosi, Gandak* and *Kiul-Badua-Chandan* have been brought under Water Resources Department to provide the optimum benefit of the major and medium irrigation projects to the beneficiaries. Development of drainage systems falls under its 10 multidimensional functions (WRD, 2017)
Bihar Urban Infrastructure Development Corporation Ltd (BUIDCo)	Incorporated in 2009, BUIDCO is mandated to execute and accelerate urban infrastructure projects in the State of Bihar. It acts as an apex body for planning and co-ordination of development activities in the state.
Bihar Pollution Control Board (BPCB)	• Planning programme for prevention and control of pollution in the state • Laying down standards of treatment of sewage and trade effluents • Evolving methods of disposal, utilisation of sewage and trade effluents on land and agriculture • Inspection of treatment plant • Conduction and participation in Research and Development relating to water pollution abatement
Katihar Municipal Corporation (KMC)	Overall management of the civic services in the city. Public sanitation, solid waste management, public health and education
State Program Management Group (SPMG)	It is an implementing arm of NMCG in the state. Coordinates and oversees the implementation of projects sanctioned by Government of India under NGRBA. Takes all such action as may appear necessary or incidental for the achievements of the objectives of the NGRBA.

Source: CSE, 2017

provisions of the Environment (Protection) Act (EPA), 1986. The council aims at ensuring effective abatement of pollution and rejuvenation of the River Ganga by adopting a river basin approach to promote inter-sectoral co-ordination for comprehensive planning and management, maintenance of minimum ecological flows in the River Ganga with the aim of ensuring water quality and environmentally sustainable development (NMCG, 2011).

The 74th Constitutional Amendment Act of 1992 reformed the sector by transferring responsibility for domestic, industrial, and commercial water supply and sewerage (WSS) from state agencies, such as Department of Public Health Engineering and State Water Boards, to Urban Local Bodies (ULBs). This transfer has resulted in a variety of implementation models, as well as a lack of clarity in roles and responsibilities of state and local agencies, resulting in large gaps in implementation (USAID, 2010).

Management and delivery of urban basic services in Katihar is governed by various institutions. The following are the institutions responsible for policy making, service provision and regulation of urban services:

3.1.4 Service provision

Institutional arrangements for water supply and sanitation in Indian cities vary greatly. Typically, a state-level agency is in charge of planning and investment, while the local government (ULB) is in charge of operation and maintenance (NIUA, 2005). Some of the larger cities have developed municipal water and sanitation utilities that are legally and financially separated from the local government. However, these utilities remain weak in terms of financial capacity. In spite of decentralization, ULBs remain dependent on capital subsidies from state governments. Tariffs are also set by state governments, which often even subsidize operating costs (Planning commission, 2002).

In Katihar, ULB is focused on the provisions of public toilets, community toilets under the SBM (Urban) and *Saat Nischay Yojna*. The ULB is solely responsible for the emptying of all type of containment systems. However, the facility is only provided to those who pay their taxes. Under the *Saat Nischay Yojna*, construction of drainage network in residential streets is one of its provisions.

3.1.5 Service standards

1. Service Level Benchmarks (SLB), 2008: Issued by the Ministry of Urban Development in 2008, which seeks to:-
   I. Identify a minimum set of standard performance parameters for the water and sanitation sector that are commonly understood and used by all stakeholders across the country.
   II. Define a common minimum framework for monitoring and reporting on these indicators.
   III. Set out guidelines on how to operationalize this framework in a phased manner. The SLB refers to improving service through better provision and delivery. It evaluates the performance of ULBs in providing urban services.

2. General Standards for Discharge of Environmental Pollutants -The Environment (Protection) Rules, 1986 (Schedule VI): Issued by Central Pollution Control Board (CPCB), a statutory organisation constituted in September 1974 under the Water (Prevention and Control of Pollution) Act, 1974. General standards are notified with respect to parameters for safe discharge to inland surface water/public sewers/land for irrigation/ marine coastal areas.
3. Code of Practice for Installation of Septic Tanks, 1985: Issued by BIS. It is a national level standards setting body of India. The code specifies standards and design consideration for installation of septic tanks.

4. Manual on Sewerage and Sewage Treatment, Second Edition, 2013: This manual has been developed by Central Public Health and Environmental Engineering Organisation (CPHEEO). It provides detailed design and guidelines for various technologies of WW management.

3.2 Planning

3.2.1 Service targets

The national mission of SBM aims to eliminate open defecation by 2019. The provision of individual toilets to households is the main component of the mission. The city has proposed to cover 28% of population (to provide access to individual/community toilet) having no access to toilets; this mission is complimented by state scheme, *Saat Nischay Yojna's- "Har Ghar Shauchalaya"* (Toilet in each house) of Government of Bihar. Construction of drainage channels is the only ongoing project under the scheme.

AMRUT, a mission to provide basic services (e.g. water supply, sewerage, urban transport) to households and build amenities in cities to improve the quality of life for all. The cities are required to submit Service Level Improvement Plan (SLIP) (includes details on funding of specified projects by ULB) to the state. The state then prepares State Annual Action Plan (SAAP) compiling all the details given in SLIPs. SAAP is then submitted to the MoUD for sanction of funds. It has been decided to divide the projects into two phases. The project under Phase-I will be implemented under AMRUT while to implement phase-II of the project funds will be explored from other sources.

Katihar is the only city in Bihar with funds already allocated for Faecal Sludge Management (FSM) under AMRUT. Following are targets:

Table 9: Target defined for FSM under AMRUT

Septage Management	FY 2017	FY 2018	FY 2019	FY 2020
Efficiency of collection of septage	10%	50%	70%	90%
Efficiency in treatment	30%	100%	100%	100%

Source: AMRUT, 2017

Table 10: Service delivery targets in accordance with SLBs

Sanitation service chain	Parameter	National benchmark	Timeframe to achieve benchmark
Containment	Coverage of toilets	100%	2019
Transport	Coverage of sewer network services	100%	2031
	Collection efficiency of the sewerage network	100%	2031
Treatment	Adequacy of sewage treatment capacity	100%	2031
	Quality of sewage treatment	100%	2031
End-use/disposal	Reuse and recycling	20%	2031
Other	Cost recovery	100%	2031
	Efficiency of collection of charges	100%	2031
	Redressal of customer complaints	80%	2031

Source: MoUD, 2008

According to rapid assessment of FSM in city done by KMC, they would need twenty emptying trucks, which will improve the emptying services provided by them. Each vehicle is expected to complete 2 trips per day with an average distance of round trip being 20 km. Along with the emptying trucks, KMC also needs 2 or more FSTPs in the municipal area, which are expected to treat 201 cum/day, initially and 222 cum/day after a period of 5 years (MoUD, 2016).

3.2.2 Investments

According to KII with the Assistant Engineer, it was noted that DPR on laying 100% coverage of sewerage network and STP was prepared by the third party but no work has been implemented on the ground and the project has been terminated. The cost of the project was INR 192 crores. As of now, funding of INR 37.75 crores (5.72 million USD) is proposed for FSM in SAAP of Bihar, although, the SAAP is yet to get approved from the centre.

Under the state government scheme of *Saat Nischay Yojna* a total amount of 2.23 lakhs (3,353 USD) is already sanctioned for FY 2016-2017 for construction of drainage network and 10% work has been completed (UD&HD, 2017).

As per the rapid assessment of FSM in city done by KMC, the budgetary provision required for capital expenditure for FSM is INR 1.75 billion (26.58 million USD). Whereas, the operation and maintenance (O&M) cost associated with the emptying services and treatment operations is estimated to be INR 548.5 million (8.31 million USD) for 5 years (MoUD, 2016). Further details of CAPEX and OPEX have been provided in Table 11.

Table 11: Estimation of CAPEX & OPEX for FSSM

S.no	Component	CAPEX (in lakhs of INR)	OPEX (in lakhs of INR)	TOTAL (in lakhs of INR)
1	Faecal Sludge Management	3,774.97 (5.6 million USD)	3,595.89 (5.4 million USD)	7,370.87 (11 million USD)
2	Liquid Waste Management	13,774.03 (20.7 million USD)	1,889.21 (2.8 million USD)	15,663.24 (23.5 million USD)
3	FSSM Total	17,549.00 (26.3 million USD)	5,485.10 (7.2 million USD)	23,034.11 (34.5 million USD)

Source: MoUD, 2016

Under Housing for All (HFA), the ULB has constructed houses for urban poor to provide shelter with facilities of toilet connected to pit with semipermeable walls and open bottom with no overflow, following are the investments:

Table 12: Investment under HFA in 2016-17 financial year (in INR)

Period	Aim	Approved Application	Account opened for disbursement of money	Remaining	Total Investment
January 2016 to 31 October 2016	2,038	852	739	1,186	109,634,000 (1.64 million USD)

Source: Accounts Department, KMC, 2016

Table 13: Details on instalment in phases under HFA (in INR)

First Installment		1st Installment received	Second Installment		2nd Installment received	Third Installment		3rd Installment received	Total	Amount to be disbursed
No of beneficiary	Amount	46% of total	No of beneficiary	Amount	38% of total	No of beneficiary	Amount	2% of total		
739	50691728		321	41,900,044 (0.6 million USD)		40	2,153,124 (0.3 million USD)		94,744,896 (1.4 million USD)	14,889,104 (0.2 million USD)

Source: Accounts department, KMC, 2016.

3.3 Reducing inequity

3.3.1 *Current choice of services for the urban poor*

There are a total of 140 slums in Katihar city out of which 93 are notified and remaining 47 are non-notified (KMC, 2016). As per Census, 2011, 18.89% of total population lives in slums. 50.14% of urban household have no access to latrines and defecate in open. As per the sample survey done in slums, it was found that the urban poor settlements within the central area of the city have semi pukka structures. Some of the slum dwellers have access to toilets whereas the remaining uses nearby residents'/relatives' toilets or the community toilets (CTs) if present. However, there are only eight CTs present in seven slums (KMC, 2016). Whereas on the other hand the slums situated in the peripheral areas have *kuchcha* structures, where agriculture is the major source of income, and households have minimal access to toilets and most of the people defecate in open including females. It is observed that most of the toilets in slums were pour flush toilet with Indian squatter pan seat connected to single pit made of concrete rings with open bottom. These systems need frequent emptying within 2 to 4 months due to smaller size of pits and larger household size. Temporary solutions like collection of FS in buckets and dumping in drains, irrigation channels were seen during the surveys. The councillor (elected representative) of ward 45 informed that the WW from 15 wards flows into low-lying areas of ward no. 45 throughout the year resulting in diseases like diarrhea, malaria etc. (refer figure 2 & 3).

Figure 11: A pit system with temporary solution to avoid frequent desludging (Source: Anil/CSE, 2016)


Figure 12: WW from 15 wards ends in low lying areas of ward 45 (Source: Anil/CSE, 2016)

3.3.2 Plans and measures to reduce inequity

Schemes of the central and state government like SBM and *Saat Nischay Yojna* are dedicated to providing basic services to all including urban poor and slum dwellers. SBM (urban) which aims to eradicate open defecation by 2019 provides grant of 12000 INR per household for construction of individual toilet with containment system. Toilets are built after submitting a request to KMC whereas there were still many cases found where no actions were taken on a year-old application.

Pradhan Mantri Aawas Yojna (PMAY), Housing for All (Urban) project is aimed at urban areas with following components: (i) Slum rehabilitation of slum dwellers with participation of private developers using land as a resource; (ii) Promotion of affordable housing for weaker section through credit linked subsidy; (iii) Affordable housing in partnership with public & private sectors; and (iv) Subsidy for beneficiary-led individual house construction or enhancement. All houses built or expanded under the mission should essentially have toilets facility. The mission has the provision of civic infrastructure as per applicable state norms/CPHEEO norms/IS Code/NBC for connection sewer if existing or has to be made through the convergence of other national or state schemes (MHUPA, 2016). Under SBM the city has proposed to construct 4 community toilets.

3.4 Outputs

3.4.1 Capacity to meet service needs, demands and targets

Sufficient amount of funding is available from central and state government under schemes like SBM, AM-RUT and *Saat Nischay Yojna*. Proposals already submitted to state through state level improvement plans (SLIP) for laying of sewerage network and installing STPs which has a budget of INR 1.92 billion (29 million USD). But the municipal functionaries lack the ability when it comes to implementation. The ongoing *Saat Nischay Yojna, that was* recently launched, had to carry out household survey in each household to get data of basic services but as per KII with the municipal officials, the data which is collected is incomplete (only 50% of all HHs).

3.4.2 Monitoring and reporting access to services

Data on service levels should be collected, documented and reported to MoUD according to the format prescribed by SLB framework. SLIPs are prepared with yearly targets. It has to be reviewed each year and progress has to be monitored. The planning documents like City Development Plan (CDP) and CSP have to be reviewed once in 5 years. This gives an opportunity to monitor the progress on service level improvement.

All new status on SBM progress gets reflected on mission progress dashboard in the SBM-Urban website. Of 4,041+ Municipalities in 650+ districts, 3,802 ULBs are active. 75 million plus cities are being monitored separately.

There is no inspection being carried out for containment system during house construction which results in poorly designed septic tanks. According to KII with the sanitary inspector of the city, data pertaining to septage emptying services is available with ULB. It was also noted that 5 out of 10 emptying services provided are not fed in the record book due to corruption issues.

3.5 Expansion

In 2016, MoHUA initiated a rapid assessment of 131 flagship cities to estimate the budgetary requirement for implementing Faecal Sludge and Septage Management (FSSM) in selected cities across the country, supported by the National Alliance for Faecal Sludge and Septage Management (NFSSM). The flagship cities include 100 smart cities, 12 cities in Ganga basin and others across India. A declaration was signed – for cities journey beyond Open Defecation Free (ODF) - mainstreaming effective FS and septage management by key decision makers and NFSSM alliance members.

In June 2015, MoUD initiated, the AMRUT with focus on the provision of basic services - water supply, sewerage, storm water drainage, pedestrian, non-motorized and public transport facilities, development of parks and open spaces.

Approval of projects under the mission will be done through the annual approval of the State Annual Action Plan by the MoUD. The States will sanction projects and approve at their level. The mission also has capacity building and reforms component that is designed to bring in improvements in service delivery, mobilization of resources. Katihar is one of the flagship city and has undergone the assessment and the state has already proposed funds for FSSM under SAAP of AMRUT.

The state government of Bihar has started *'Saat Nischay'* (seven resolves mission). The main objective of the mission is to strengthen the state's infrastructure and to improve socio economic status. To execute this mission a special team has been set up by the state government. The team includes experts in all the sectors and they will work on this mission in Bihar (PDD, 2017). Seven resolves are road connectivity and lined drainage system, continuous electricity, clean drinking water and sanitation, toilet in every home, youth employment and skill development, better access to higher education, women empowerment through the reservation.

Objectives under *Shauchalay Nirmaan, Ghar Ka Sammaan* (Toilet in every home) is to make the state of Bihar healthy, hygienic and free from open-defecation where each household would be equipped with a toilet. Almost 1.72 lakh crore toilets would be constructed under this scheme. Whereas in *Ghar Tak Pakki Gali–Naaliyan* (Road connectivity and lined drainage system) the objective includes developing paved roads and lined drainage networks in each habitation. Fund allocated for this sector is INR 78 crores (170,000 USD) (CMS, 2016).

Nirmal Dhara is proposed under Namami Gange Programme – an initiative ensuring sustainable municipal sewage management which plans for (NMCG, 2014b):-

- Project prioritization in coordination with MoUD
- The incentive for states to take up projects on Ganga Main-stem by providing an additional share of central grants for sewerage infrastructure.
- Uniform standards for both MoUD scheme and Namami Gange programme, 10 years mandatory O&M by the same service provider at par with NGRBA programme and Public- Private Partnership (PPP), Mandatory reuse of treated water.

- Expanding coverage of sewerage infrastructure in 118 urban habitations on banks of Ganga-estimated cost by MoUD is INR 51,000 crores (7.6 Billion USD).

3.5.1 Stimulating demand for services

The following activities can stimulate demand for services:

- Awareness generation on septic tank construction, regular desludging of septic tanks through awareness campaigns on health effects due to unsafe managed excreta
- Awareness campaigns on ill effects of environmental degradation because of disposal of untreated septage into local environment
- Capacity building for ULB staff on septage management
- Skill development of local masons and plumbers

3.5.2 Strengthening service provider roles

Emptying services are only provided by ULB and there are no private operators. It was witnessed that the workers were lacking professionalism for their job. PPE can be provided to avoid contact with pathogens and training should be given to the emptiers.

Completed emptying trips are fed in the database, this could be used to calculate the quantum of septage collected so that the capacity of treatment plant can be decided.

SBM majorly provides funds for access to toilets but thereafter lacks funds for treatment and disposal of sewage and FS throughout the service chain. The service delivery of sewage and FS treatment and disposal can be met through converging the two-national flagship programmes – SBM and NMCG. The ULB can take the benefit of the programmes and strengthen the services along the value chain and achieve the goals of both programmes.

4 Stakeholder engagement

4.1 Key informant interviews

The KIIs were conducted with the stakeholders having a role or interest in sanitation and FSM services within the city. The relevant departments were contacted through e-mail, letter, call and fax prior to visit to the concerned departments. The purpose of the SFD study and depth of data required was conveyed through an introductory letter to respective departments. Four KIIs were done with the elected representatives, municipal functionaries from the concerned departments, slum dwellers, local masons and public toilet owners.

4.2 Focus group discussions

The FGDs were conducted to complement, validate and challenge data collected during literature review and interviews. Focus group discussions were considered as one of the major contributors towards gaining the critical on ground situations and practice at the grass root level. A total of 4 FGDs were conducted with key officials from KMC, local masons and slum dwellers.

Stakeholders were identified and task force was formulated and notified under the mandate by NUSP (refer appendix 7.9 for more details). An FGD was conducted with the SBCLTF's members and the draft SFD was presented and analyzed. They validated the collected data and the final SFD graphic.

4.3 Field observations

In order to understand the variety/typology of OSS sample surveys were conducted. The sample was carefully chosen to get good spatial representation from each ward of OSS dependence based on Census, 2011. Around 5-8 households were surveyed in each of the selected wards of the city. This resulted in a much better understanding of the city that helped us to move forward with a perspective and a plan. Such surveys, observations and KIIs helped to produce a more credible and accurate SFD, provides qualitative data and perhaps more precise quantitative data relating to the service delivery. Some of the observations are listed below.

The city can be studied in two parts very easily. The peripheral areas and the inner-city areas. The resemblance in the standard of living and access to basic amenities were remarkable. It was observed that slums have very less or no sanitation facilities. The slums located in the peripheral areas resembled the characteristics of rural areas. These settlements were considered as low-income areas. The prime occupation of residents from these areas is agriculture. Large fields with a number of planted trees, cattle & ample open spaces are what the peripheral areas looked like. As per KII with ward representatives and FGDs, it was noted that almost 50% of the HHs do not have access to toilets. Also, no community toilets were visible during the survey. The rest of the 50% HHs have a single unit toilet which is connected to a small pit. These toilets were built under the state government scheme but only a handful of HHs was benefitted from the scheme. In some wards, it was observed that the share of open defecation is as high as 90% of the ward's population. During survey, it was found that a number of residents were benefitted from the central scheme of Rajiv Awas Yojana (RAY) which promises to provide shelter to the homeless. It also provides the facility of individual household toilets connected to a single pit. However, there was no arrangement seen for WW management. Whereas on the other hand, the urban poor within the central part of the city does have the facility of the toilet which is functional in the form of individual/community or shared toilet. Lack of open spaces reduced the possibility of defecating in open. Existing community/public toilets are not enough to cater to the urban poor. Emptying services are based on demand basis where the average emptying period is about 8 years for septic tanks. Pits constructed under SBM needs frequent emptying due to smaller containment systems. The supernatant from the septic tanks finds its way to low lying areas via open drains.

5 Acknowledgement

This report was compiled as part of the SFD promotion initiative project funded by the Bill and Melinda Gates foundation (BMGF). We would like to thank the team from KMC Mr Bijay Kumar Singh, Mayor, Mr Amar Jha, Assistant Engineer, Sanitary Inspector, Kailash Chaudhary & Mr Pervez Salim, Sanitation In-charge for providing all the required secondary data and cooperating for KII & FGDs.

Mr Abhishek Kumar, Junior Engineer, Mr Sattar, driver who helped in conducting sample survey and FGDs on the ground, without their help this report would not have been possible. Mr Anshul Aggarwal, an intern at CSE helped in the collection of data and in conducting random survey and FGDs on the ground, without his help this report would not have been possible. Special thanks to Dr Suresh Kumar Rohilla, Programme Director, CSE, for his supervision and guidance at every step of the assessment and report writing.

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7 Appendix

7.1 Stakeholder identification

Table 14: Stakeholder identification

S.L No.	Stakeholder group	In context of Katihar
1.	City Council/ Municipal authority/Utility	Katihar Municipal Corporation
2.	Ministry in charge of urban sanitation and sewerage	Urban Development & Housing Department, Bihar
3.	Ministry in charge of urban solid waste	Urban Development & Housing Department, Bihar
4.	Ministries in charge of urban planning finance and economic development	Urban Development& Housing Department, Bihar
	Ministries in charge of environment protection	Department of Environment and Forest
	Ministries in charge of health	Department of Health
5.	Service provider for construction of onsite sanitation technologies	Katihar Municipal Corporation
6.	Service provider for emptying and transport of FS	Katihar Municipal Corporation
7.	Service provider for operation and maintenance of treatment infrastructure	Katihar Municipal Corporation
8.	Market participants practising end-use of FS end products	N/A
9.	Service provider for disposal of FS (sanitary landfill management)	Katihar Municipal Corporation
10.	External agencies associated with FSM services: eg: NGOs, academic institutions, donors	Centre for Science and Environment

Source: CSE, 2017

7.2 Tracking of engagement

Table 15: Tracking of engagement

S.no	Name of Organization	Designation	Date of engagement	Purpose of engagement
1	KMC (Technical staff)	Assistant Engineer	10-11-16	FGD
2		Sanitary Inspector		
3		Junior Engineer		
4		Sanitation In charge		
5	KMC	Mayor	11-11-16	KII
6		KMC driver		
7		Ward Councillor (W45)		
8	KMC (elected representatives)	Ward Councillor (W3)	12-11-16	FGD
9		Ward councillor (W5)		
10		Ward councillor (W1)		
11		Ward councillor (W6)		
12	Private	Public toilet in charge	12-11-16	KII
13	SBCLTF	21 members of SBCLTF	11-05-17	FGD

Source: CSE, 2017

7.3 SFD graphic

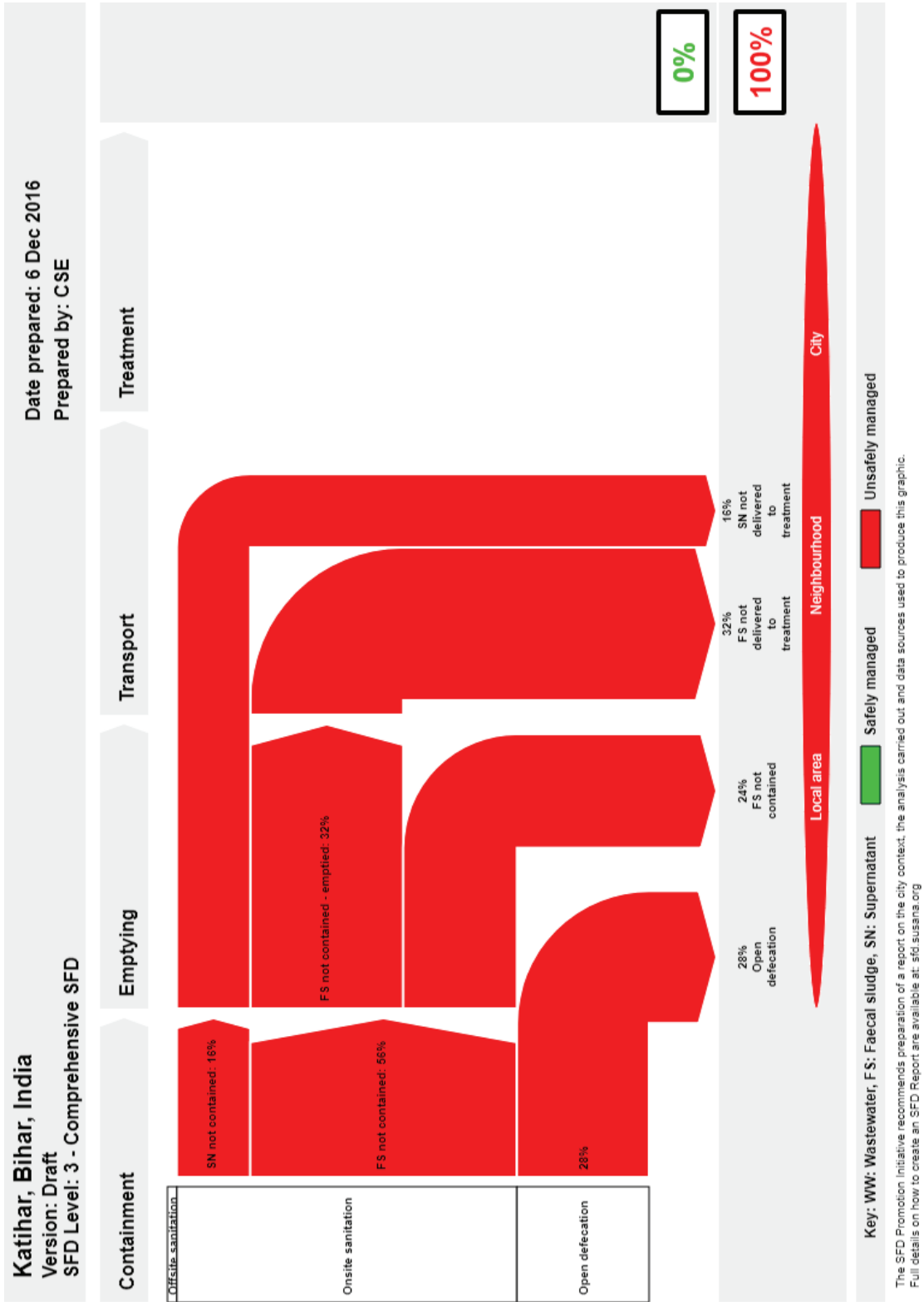

Figure 13: SFD graphic (Source: SFD graphic generator)

7.4 SFD brief explanation

Table 16: Percentage of the population using each system technology and method

System Type	Containment	Emptying	Transport	Treatment & End-use/ disposal
Offsite	Offsite systems do not exist in the city			
Onsite	T1A2C5: 13% of population is dependent on septic tank connected to soak pits. T1A2C6: 31% of population is dependent on septic tank connected to open drain. T2A6C10:28% of population is dependent on unlined pit with no outlet or overflow	Since most of the population is getting their systems emptied, it is assumed 90% of population has their onsite technology emptied. Since there is no clear differentiation between % of septage and supernatant, it is assumed to be 50% each. SN is assumed to be 15% and FS not contained - emptied comes out to be 32% and FS not contained-not emptied becomes 25%.	No treatment facility exists hence no FS is transported to treatment plant, therefore, FS not delivered to treatment plant is 32%. SN from septic tank transported through open drains to open low lying areas.	No treatment facility exists hence no FS or SN is treated; therefore FS and SN treated is 0%. All the FS emptied ends up in solid waste dumping site. SN ends up in low lying areas of the city
Open defecation	28% of population practice open defecation.			

Source: CSE, 2017

7.5 Context-adapted SFD

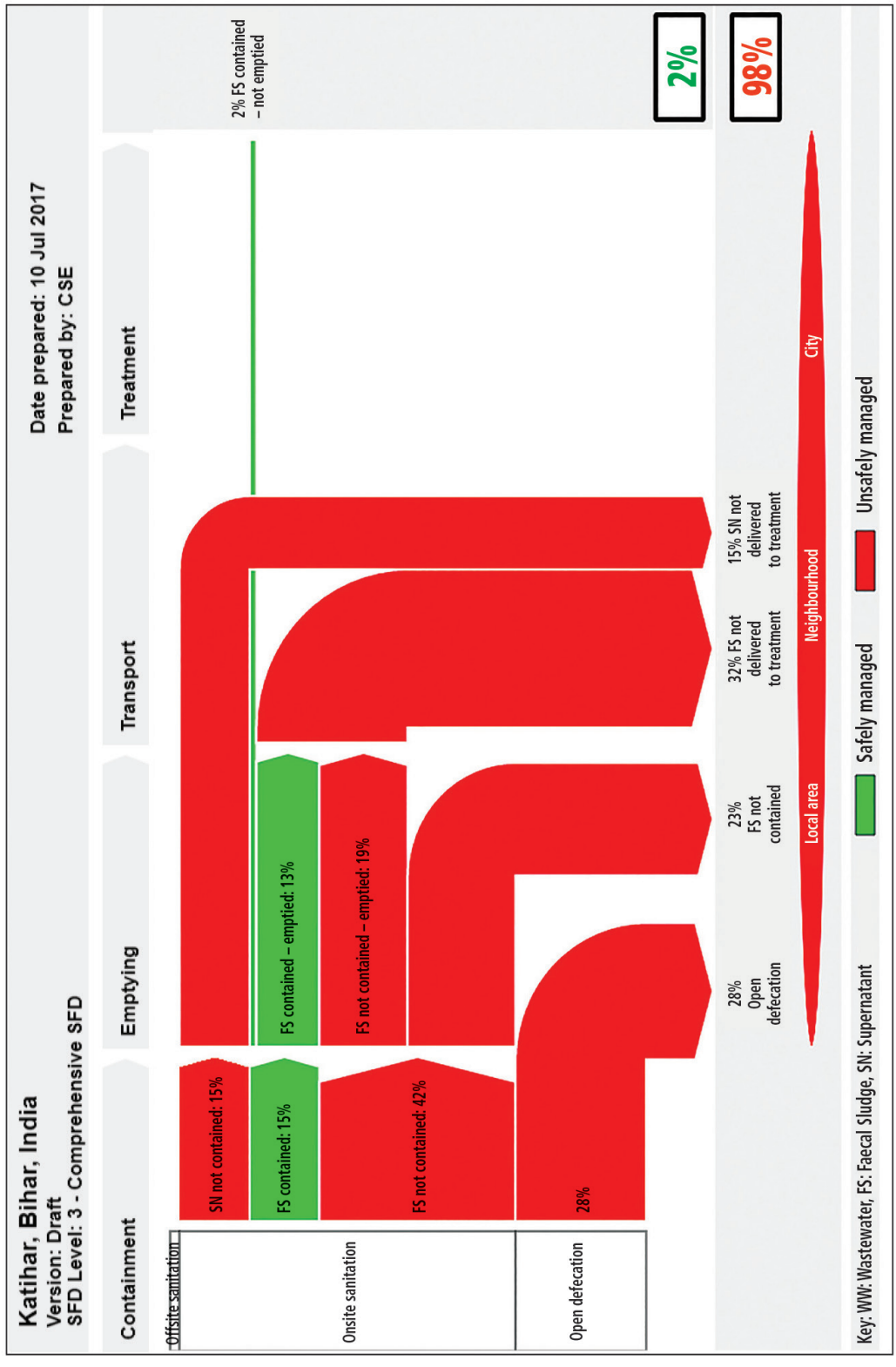

Figure 14: Context adapted SFD graphic (Source: CSE)

7.6 SFD selection grid

Table 17: SFD calculation grid

List A: Where does the toilet discharge to? (i.e. what type of containment technology, if any?)	List B: What is the containment technology connected to? (i.e. where does the outlet or overflow discharge to, if anything?)									
	to centralised combined sewer	to centralised foul/separate sewer	to decentralised combined sewer	to decentralised foul/separate sewer	to soakpit	to open drain or storm sewer	to water body	to open ground	to 'don't know where'	no outlet or overflow
No onsite container. Toilet discharges directly to destination given in List B					Significant risk of GW pollution Low risk of GW pollution					Not Applicable
Septic tank					T2A2C5 Low risk of GW pollution	T1A2C6				
Fully lined tank (sealed)					Significant risk of GW pollution Low risk of GW pollution					
Lined tank with impermeable walls and open bottom	Significant risk of GW pollution Low risk of GW pollution	Significant risk of GW pollution Low risk of GW pollution	Significant risk of GW pollution Low risk of GW pollution	Significant risk of GW pollution Low risk of GW pollution	Significant risk of GW pollution Low risk of GW pollution					Significant risk of GW pollution Low risk of GW pollution
Lined pit with semi-permeable walls and open bottom	Not Applicable									Significant risk of GW pollution Low risk of GW pollution
Unlined pit										T2A6C10 Low risk of GW pollution
Pit (all types), never emptied but abandoned when full and covered with soil										Significant risk of GW pollution Low risk of GW pollution
Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil										
User interface failed, damaged, collapsed or flooded										
Containment (septic tank or tank or pit latrine) failed, damaged, collapsed or flooded										
No toilet. Open defecation	Not Applicable							T1B11 C7 TO C9		Not Applicable

7.7 SFD calculation grid

Table 18: Selection grid

Katihar, India, 06 Dec 2016. Field based study
Population: 226261
Proportion of tanks: septic tanks: 50%, fully lined tanks: 50%, lined, open bottom tanks: 50%

System label	Pop	F3	F4	F5	S4e	S5e
System description	Proportion of population using this type of system	Proportion of this type of system from which faecal sludge is emptied	Proportion of faecal sludge emptied, which is delivered to treatment plants	Proportion of faecal sludge delivered to treatment plants, which is treated	Proportion of supernatant in open drain or storm sewer system, which is delivered to treatment plants	Proportion of supernatant in open drain or storm sewer system that is delivered to treatment plants, which is treated
T2A2C5 Septic tank connected to soak pit, where there is a 'significant risk' of groundwater pollution	13.0	90.0	0.0	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	31.0	90.0	0.0	0.0	0.0	0.0
T2A6C10 Unlined pit, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	28.0	90.0	0.0	0.0		
T1B11 C7 TO C9 Open defecation	28.0					

Source: SFD graphic generator

7.8 Maps

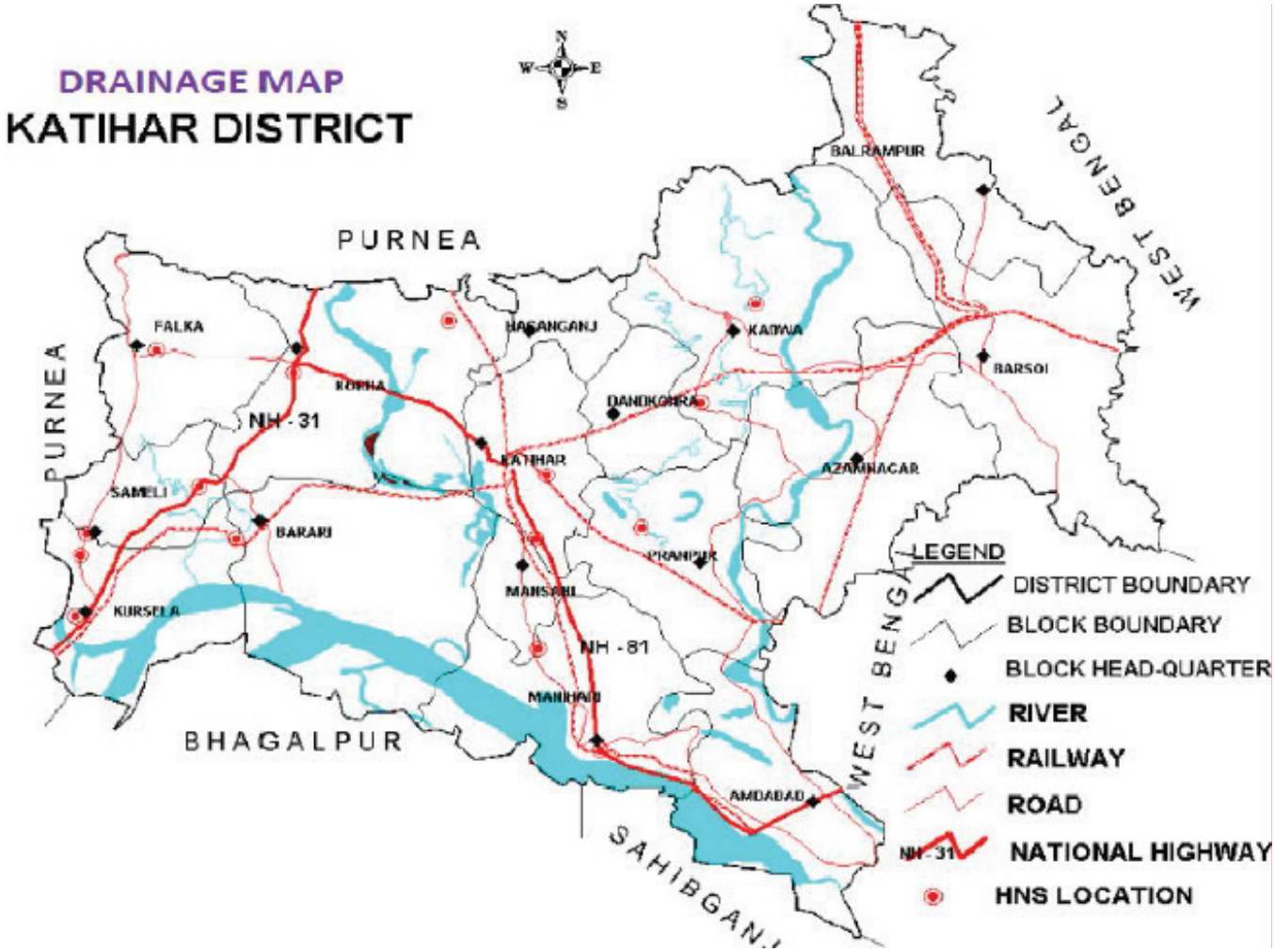

Figure 15: Drainage map of Katihar district (Source: CSP, 2013, Katihar)

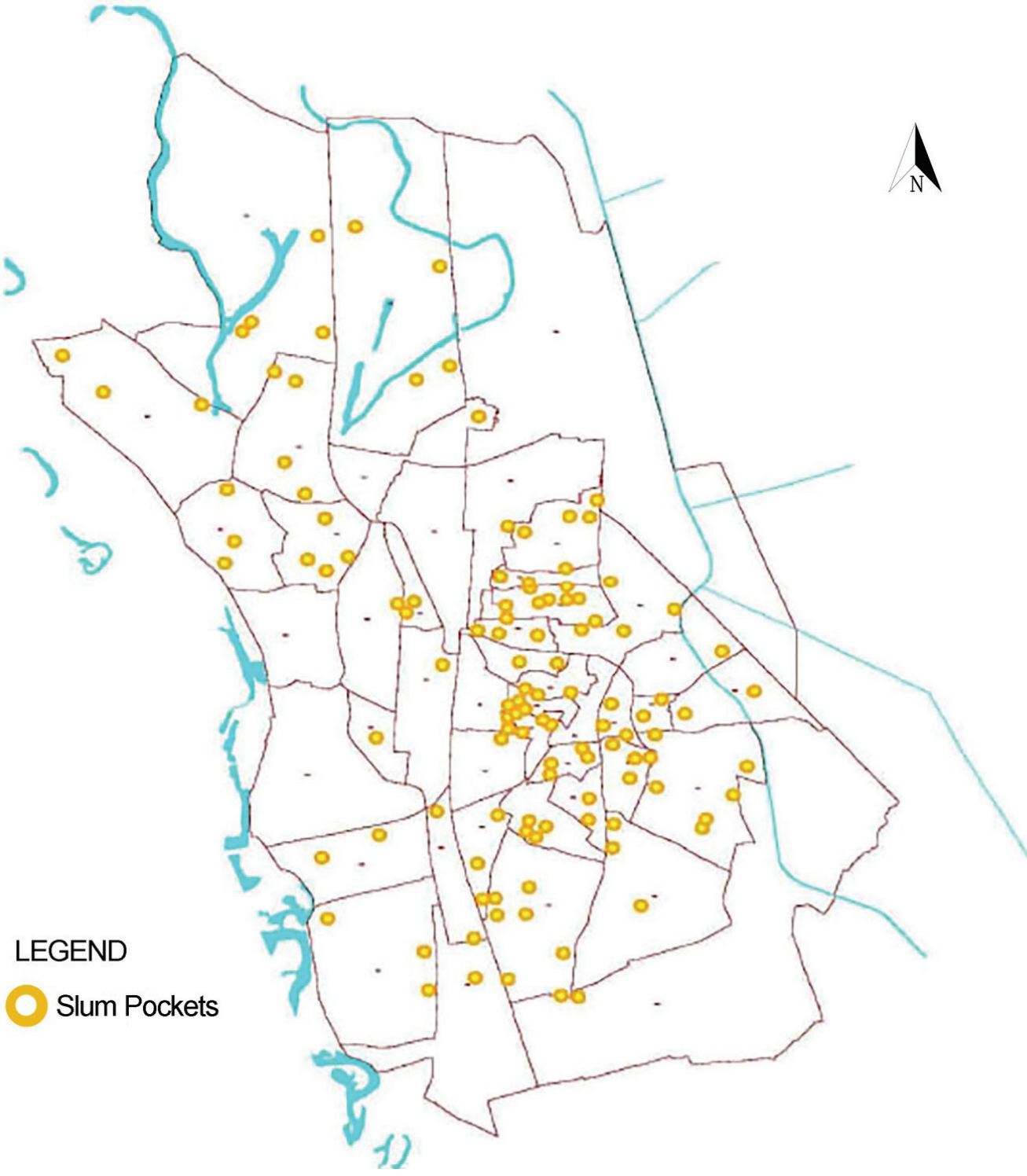

Figure 16: Slum pocket in Katihar city (Source: CSP, 2013, Katihar)

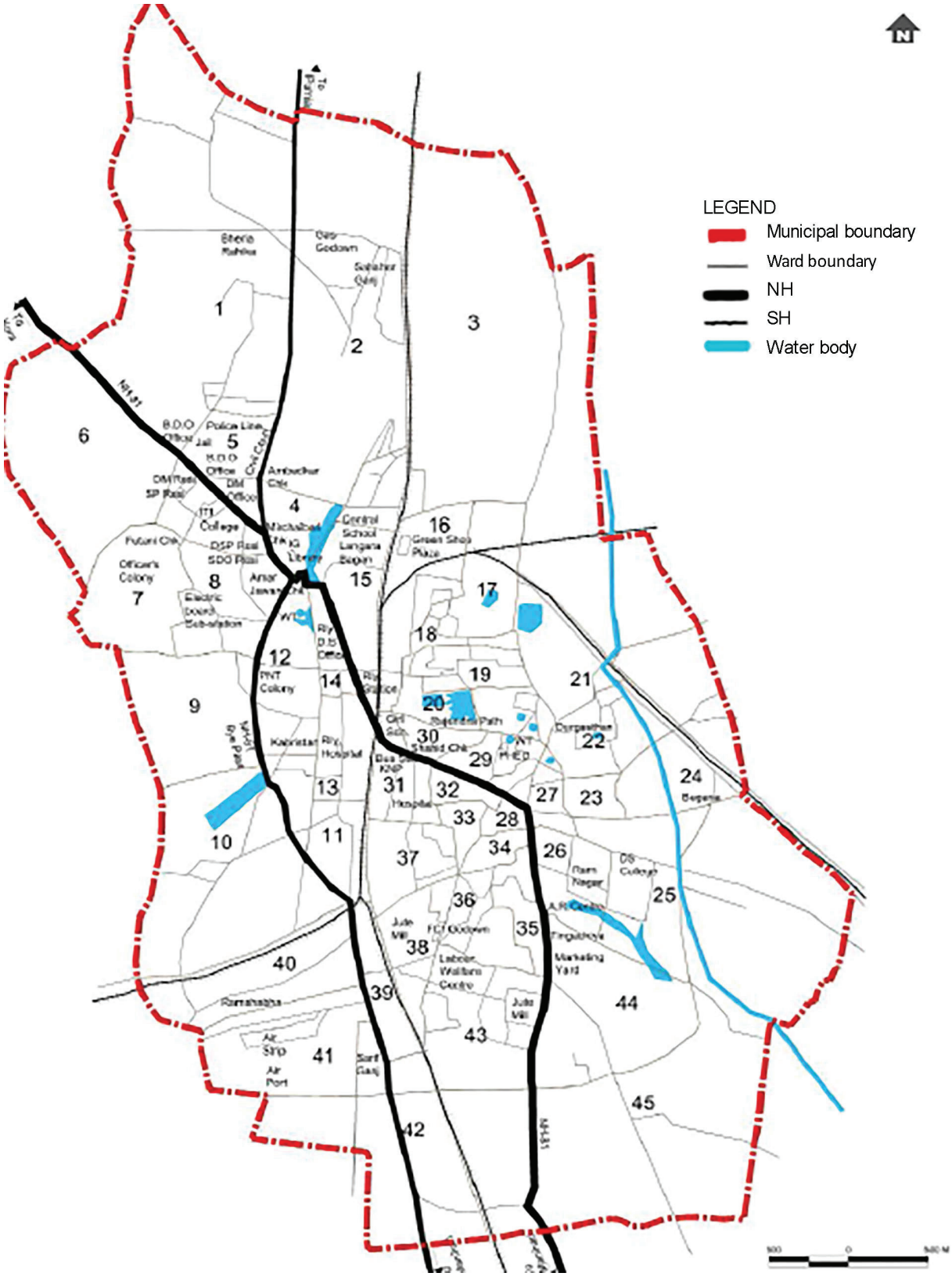

Figure 17: Water bodies in Katihar city (Source: CDP, 2010, Katihar)

7.9 Details of PT and CT within corporation area

Table 19: Public and community toilet details

S.NO	Location of toilet	Public toilet/Community toilet	No of users per day	Ward No	No. of functional toilet seats (both men & women)				Operation & Maintenance by			Toilet connected to	Septic tank size in feet LxBxxH	Emptying frequency in yrs	ST Outlet to drain
					Men		Women		ULB	PPP	Community				
					Urinals	Seats	Urinals	Seats							
1	Court compound mirchaibori	PT	100	5	2	5	2	5					22x8x6	5 Years	
2	Railway Station campus	PT	100	20		7		3					15x8x6	8 Years	
3	Old bus stand	PT	200	31	2	5	2	5		ü			18x6x6	5 Years	
4	New market	PT	200	20	1	4	1	2					18x8x6	5 Years	
5	Dargasthan	PT	50	22	1	8	1	8					18x8x6	1 Years	
6	Horigari	PT	75	27									18x8x6	6 Years	
7	Dehariya horizan tola	CT	20 Family	38	1	3	1	2				Septic tank	16x7x6	5 Years	
8	Sitlasthan mirchaibori	CT	25 Family	8	1	3	1	2					12x8x6	1 Years	
9	Laxkania harizan tola	CT	10 Family	19	1	3	1	2			ü		12x8x6	8 Years	OD
10	Teja tola	CT	30	20	1	4	1	2					16x8x6	10 Years	OD
11	Gaushala	CT	10	39	1	2	1	2					12x8x6	10 Years	OD
12	3 NO. Gate	CT	10	36	1	2	1	2					12x8x6	10 Years	OD

Source: KMC, 2016

7.10 Swachh Bharat City Level Task Force, KMC

कार्यालय : नगर निगम, कटिहार।

पत्रांक– 2196 /न०नि०,

प्रेषक :– नगर आयुक्त,
नगर निगम, कटिहार।

सेवा में,

श्री मंजूर खाँ –	उप सभापति
श्री अजय कुमार ठाकुर –	संयोजक
श्री अमर कुमार झा –	सहायक अभियंता
श्री कैलाश चौधरी –	स्वच्छता निरिक्षक
श्री उपेन्द्र कुमार –	कार्यपालक अभियंता जिला शहरी विकास अभिकरण
मुख्य चिकित्सा पदाधिकारी –	स्वास्थ्य पदाधिकारी
श्री सुबोध शंकर –	कार्यपालक अभियंता लोक स्वास्थ्य अभियंत्रण विभाग
श्री बिमल सिंह बेगानी –	वार्ड पार्षद
श्रीमती मुसरत खातुन –	वार्ड पार्षद
श्री नरेश शर्मा –	व्यवसायिक प्रकोष्ठ प्रतिनिधि
श्री अनिल चमरिया –	सचिव रेड क्रॉस सोसाईटी एवं होटल व्यवसाय
पंच फाउण्डेशन –	एन०जी०ओ०
श्री प्रो० डी० के० झा –	शैक्षणिक संस्थाओं के प्रतिनिधि
श्री अशोक कुमार –	सांस्कृतिक क्षेत्र
श्री राजरत्न कमल –	मिडिया
श्री प्रो० पी०एन० केसरी –	शहर के प्रबुद्ध नागरिक जो स्वच्छता कार्यक्रम में रूची रखते है
श्री नवीन कुमार गुप्ता –	पेंशनर एसोसियेशन
श्री के०के० सिंह –	अंचल पदाधिकारी
वरिष्ठ मंडल अभियंता समन्वय –	रेलवे
श्री सुरेश कुमार रोहिला, प्रोग्राम डायरेक्टर –	सी०एस०ई०
श्री संजय सिंह –	विधि क्षेत्र के प्रतिनिधि

नगर स्वच्छता कार्य दल (CSTF), नगर निगम, कटिहार।

कटिहार, दिनांक 22 वी, दिसम्बर 2015

विषय :– दिनांक– 26.12.2016 को बैठक में भाग लेने के सम्बंध में।

महाशय,

उपर्युक्त विषयक के संदर्भ में कहना है कि नगर स्वच्छता के संबंध में दिनांक– 26.12.2016 को अपराहन् 2.00 बजे नगर निगम कार्यालय के सभा प्रशाल में माननीय महापौर की अध्यक्षता में बैठक आहूत की गई है।

अतः अनुरोध है कि उक्त बैठक में निर्धारित तिथि को भाग लेने की कृपा की जाय।

विश्वासभाजन,

नगर आयुक्त,
नगर निगम, कटिहार

E/Kalam/All Letter/M.S Word

Figure 18: SBCLTF official notification (Source: KMC, 2016a)

Table 20: List of SBCLTF members

S.No	Name	Designation	Organisation
1	Manjur Khan	Deputy Mayor	KMC
2	Ajay Kumar	Municipal Commissioner	
3	Amar Kumar Jha	Assistant Engineer	
4	Kailash Chaudhary	Sanitary Inspector	
5	Upendra Kumar	Executive Engineer	District Urban Development Agency, Katihar
6	Yogendra Rajak	Civil Surgeon	Sardar hospital, Katihar
7	Subodh Singh	Executive Engineer	Public Health and Engineering Department, Katihar
8	Vimal Singh Begani	Ward Councillor	Katihar Municipal Corporation
9	Nusrat Khatun	Ward Councilor	
10	Suresh Kumar Rohilla	Programme Director	Centre for Science and Environment
11	Naresh Sharma	Representative	Commercial Association, Katihar
12	Anil Chamriya	Secretary	Red Cross Society & Hotel Association
14	Suman Kumar Singh	District Coordinator	Panch Foundation (NGO)
15	Ashok Kumar	Representative	Cultural Sector
16	Rajratan Kamal	Reporter	PTI & Dainik Bhaskar
17	P.N Keshri	Social worker and ex.VC	
18	Naveen Kumar Gupta	Employee	Pensioner Association
19	KK Singh	Senior Board Engineer	Zone Office□bearer
20	Sanjay Singh	Representative	Bar Association
21	D.K. Jha	Representative	Educational Institutions

Source: KMC, 2016a

Figure 19: SBCLTF FGD at KMC (Source: KMC, 2016)

7.11 Swachh Bharat City Level Task Force, KMC

Figure 20: Household survey in peri urban areas (Source: Anshul/CSE, 2016)

Figure 21: FGDs conducted in slums (Source: Anshul/CSE, 2016)

Figure 22: FGDs with KMC staff and ward councillors (Source: Anshul/CSE, 2016)

Figure 23: KII with ward councillor (Source: Anshul/CSE, 2016)

Figure 24: Kosi River and dam to prevent flooding (Source: Anil/CSE, 2016)

Figure 25: Current situation in slums (Source: Anil/CSE, 2016)

7.12 Household survey questionnaire

CENTRE FOR SCIENCE AND ENVIRONMENT, NEW DELHI
Focus Group Discussion (FGD)
QUESTIONNAIRE

Date: ___/ ___ / ___, **Area Name:** _____, **Ward:**_____,

Co-ordinates:_____, **No. of Participants (4-10)** _____

Group Profile
No. of Male: No. of Female:

Respondents	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Gender										
Age										
Marital Status ((U/M)										
Household size										
Social category (G, OBC, SC, ST										
House Structure (P,K, SP)										
Latrine facility (IT, ST, CT, PT, ODF)										
IT: Individual Toilet, ST: Shared toilet, CT: Community Toilet, PT: Public Toilet, ODF: Open Defecation										
Who constructed toilet (SF, Govt.,Pvt.,NGO)										

Respondents	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Does the current state of toilet cause trouble (Y/N)? State reasons??										
Do all females use toilet (Y/N)?										
Do all males use toilet (Y/N)?										
Do all children use toilet (Y/N)?										
Types of toilet (ISP, Western)										
ISP: Indian Squatter Pan										
Kind of flushing (PF/CF)										
PF: Pour Flush, CF: Cistern Flush										
User interface connected to(S,ST,PL,OD, OG,LIC/O,LSC/ O)?										
S: Sewer, ST: Septic Tank, PL: Pit Latrine, OD: Open Drain, OG: Open Ground, LIC/O: Lined tank impermeable/Semipermeable walls with closed/open bottom,										
Details of the tank										
Circular/rectangular/Square (C/R/S)										
Length: Breadth: Depth										
Comment:										

2

Figure 25: Household questionnaire used during random survey (Source: CSE, 2016)

7.13 FS emptiers questionnaire

CENTRE FOR SCIENCE AND ENVIRONMENT, NEW DELHI
Septic tank Cleaner Survey

Date: ...../Nov/2016 Time: ..... Place: .....

1. Owner name & Mob. No. .....
2. De-sludging process (Manual/Mechanical/Semi M.M) .....
3. Reasons for adopting the process.....
4. Type of vehicle used for transportation (Tractor/Truck/trolley/others)

   .....
5. Price of vehicle.....
6. Type of ownership (Own vehicle /hire from others) .....
7. Number of vehicles (total in your area). . .....
8. Capacity of vehicles .....
9. Typical age of Vehicles .....
10. Vehicle Assembling point.....
11. Vehicle Details.

New or second hand	
Mileage	
Durability of vehicle (Max.)	
Capacity of pump (in HP)	
Location of pump on vehicle	
Tank maintenance details (if any rupture etc.)	
Tank durability (max.)	

12. Typical No of trips per day .....
13. Average distance per trip.....
14. Area of responsibility.....
15. Fees charge/trip.....
16. Time taken for desludging activity.....
17. Where is sludge dumped .....
18. Where should be disposal site to be located? .....
19. Official dumping site for city.....
20. Reuse for sludge .....
21. Total Quantity of faecal sludge received per day per trip (Approx.).....
22. Septic tank location (top place used for any activity or unused).....
    .....
23. Septic Tanks details (Capacity, dimension, materials used for construction, Inlet and outlet baffle etc.....
24. Areas having highest demand for sludge clearing .....
25. Frequency of desludging per household.....
26. Fees Charges /Trip (Competitors) .....
27. NO. Of private Operators in your area .....
28. Are you maintaining any register/produce any bill for payment? .....
29. Is the current practice suitable for the you (Suggest any changes)

    .....
30. Major issue running in the business

    .....
31. Safety Measures if any during desludging process .....
32. Marketing Strategy.....
33. Why you are doing this work?

    .....

Figure 26: Survey questionnaire used during emptiers interview (Source: CSE/2016)

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