



SFD Lite Report

Odagaon, Odisha India

This SFD Lite Report was prepared by
Centre for Science and Environment.

Date of production/ last update: 30/08/2021

1 The SFD Graphic

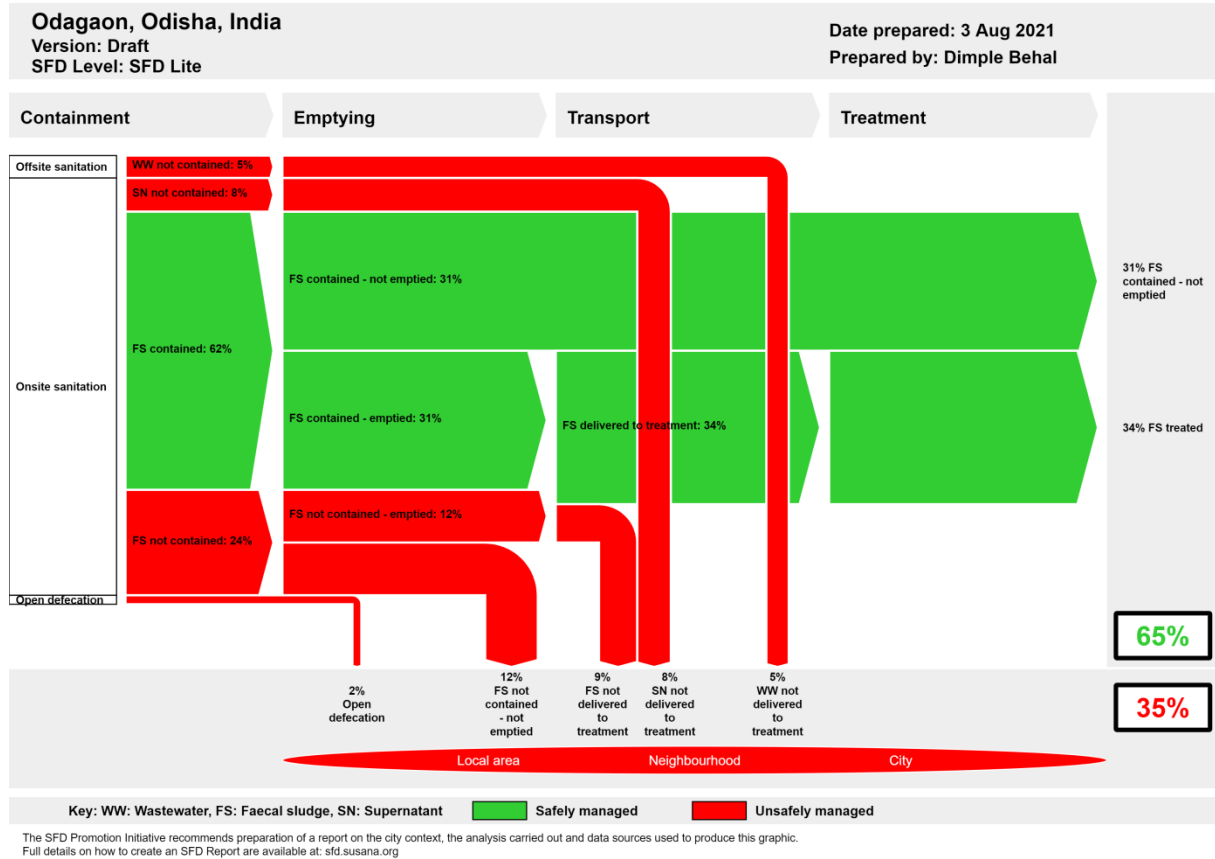


Figure 1: SFD Graphic of Odagaon (Source: Dimple Behal/CSE).

2 SFD Lite information

Produced by:

- Centre for Science and Environment, New Delhi.
- This report was compiled as part of the SFD Promotion Initiative (SFD-PI) phase 3, project funded by the Bill and Melinda Gates Foundation (BMGF). We would like to thank Ms Swati Mishra, Executive Officer (EO); Mr. Subrat Kumar Mohapatra, Junior Engineer(JE); Barada Prasanna Das, Sanitation expert and Sudhanshu Kumar Maharana, MIS.
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Collaborating partners:

- Centre for Science and Environment (CSE).
- Odagaon Notified Area Council (NAC), Odagaon, Odisha.

Date of production: 30/08/2021

3 General city information

Odagaon is a town and Notified area council (geographical coordinates as 20°00'57.65"N 84°59'15.70"E) in the Nayagarh district of Odisha, India (Figure 2). It is around 100km away from the capital city of Bhubaneswar. As per Census of India, 2011, Odagaon Urban has the population of 5,401 with 1,240 households. As nearby rural areas have been included in new jurisdiction boundary, the population as of 2011 as by the Odagaon Notified Area Council (NAC) is 11,941 with 2,758 households. Current data from NAC shows that the population has been increased to 15,800 with 3,420 households. The current population has been used for the preparation of this SFD lite report (Table 1). The Urban Local Body (ULB) has a total of 15 wards which is being administered by NAC for the provision of civic facilities. The total area under the jurisdiction is 15.14 sq. km. The NAC has been declared by ODF+ in 2020.

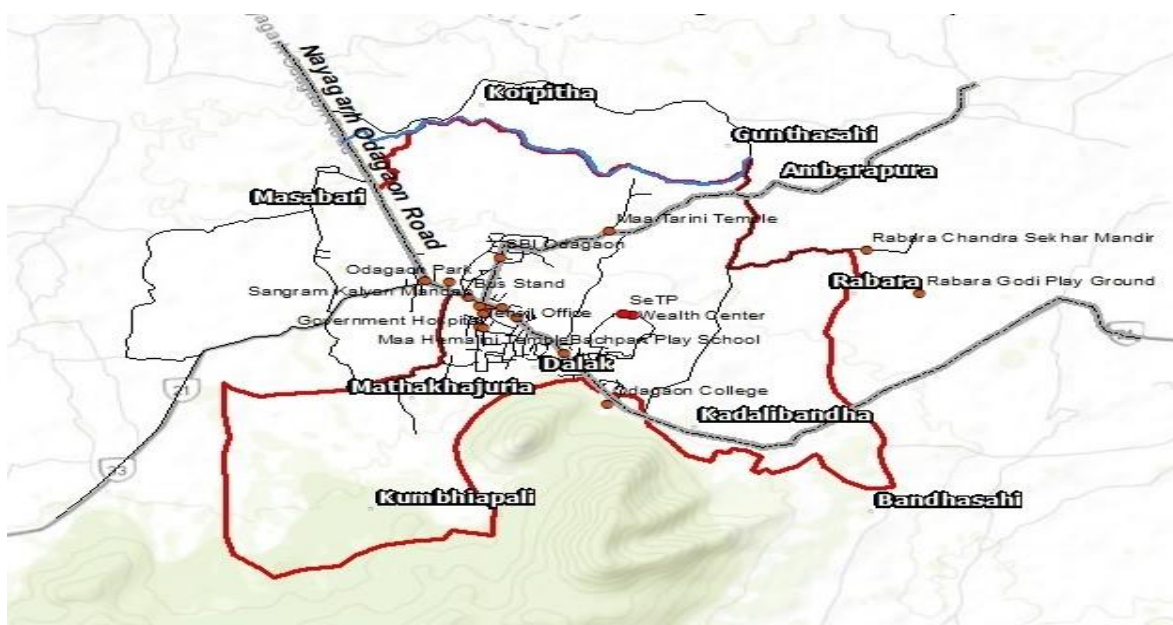


Figure 2: Odagaon NAC base map (Source: Dimple Behal/CSE).

The climate is generally dry tropical. The actual rainfall and the normal rainfall of the Nayagarh district recorded are found to be 1750.7mm and 1449.1 mm respectively¹. Odagaon south has a hilly terrain through which water is supplied to half of the households of NAC. The average elevation is 32 m. The water is supplied by NAC through community water taps to some of the households. Rest of the households are dependent upon handpumps, wells and borewells.

Table 1: Population growth rate of Odagaon. (Source: Cenus 2011).

Census Year	Population	Growth Rate (%)	Source
2011	11,941	--	NAC Odagaon
2020	15,800	32.3%	NAC Odagaon

In summer months, NAC supplies water through water tankers where piped water supply is not there. The water is supplied for two hours in the morning. People here face issues related

¹ http://cgwb.gov.in/District_Profile/Orissa/Nayagarh.pdf

to water supply due to groundwater unavailability. The average depth of groundwater is around 30ft (9.14m). While post monsoon, water is available within 25ft (7.62m) depth as water level rises by 15.15%². The water table is shallow in most part of the district. The pre-monsoon depth to water level values are generally in the range of (5m to 10m)³. Odagaon has around 15 number of water bodies, two *nullah* (large open drain) named Sagar and Bedha. The predominant occupation of residents of Odagaon is paddy and lentil cultivation. As per Central Ground Water Board (CGWB) report, there is no appreciable change in water levels for 10 years till 2013. Sanitation facilities are provided by the NAC all to the wards.

4 Service Outcomes

Odagaon, Odisha, India, 3 Aug 2021. SFD Level: SFD Lite
Population: 15800

Proportion of tanks: septic tanks: 100%, fully lined tanks: 50%, lined, open bottom tanks: 100%

Containment								
System type	Population	WW transport	WW treatment	FS emptying	FS transport	FS treatment	SN transport	SN treatment
	Pop	W4c	W5c	F3	F4	F5	S4e	S5e
System label and description	Proportion of population using this type of system (p)	Proportion of wastewater in open sewer or storm drain system, which is delivered to treatment plants	Proportion of wastewater delivered to treatment plants, which is treated	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
T1A1C6 Toilet discharges directly to open drain or storm sewer	5.0	0.0	0.0					
T1A2C5 Septic tank connected to soak pit	22.0			50.0	80.0	100.0		
T1A2C6 Septic tank connected to open drain or storm sewer	6.0			50.0	80.0	100.0	0.0	0.0
T1A2C8 Septic tank connected to open ground	10.0			50.0	80.0	100.0		
T1A3C6 Fully lined tank (sealed) connected to an open drain or storm sewer	15.0			50.0	80.0	100.0	0.0	0.0
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	10.0			50.0	80.0	100.0		
T1A6C10 Unlined pit, no outlet or overflow	30.0			50.0	80.0	100.0		
T1B11 C7 TO C9 Open defecation	2.0							

Table 1: SFD Matrix for Odagaon (2021) (Source: Dimple Behal/CSE).

The outcome of the SFD graphic shows that 65% of the excreta flow is classified as 'safely managed', and the remaining 35% is classified as unsafely managed (Figure 1). The unsafely managed excreta originate from Faecal Sludge (FS) - not contained, not emptied (12%), Supernatant (SN) not delivered to treatment (8%), FS not delivered to treatment (9%), Wastewater (WW) not delivered to treatment (5%) and open defecation (2%). The safely managed excreta originate from FS contained - not emptied (31%) and FS delivered to treatment and treated (34%).

² CGWB, Ground water year book 2019-20, South East Region.

³ http://cgwb.gov.in/District_Profile/Orissa/Nayagarh.pdf

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

4.1 Offsite Sanitation Systems



Figure 3: FGD with Swach Saathis (Source: Dimple Behal/CSE).



Figure 4: Interview with Executive Officer (Source: Dimple Behal/CSE).



None of the households in Odagaon NAC are connected to sewer network. Based on the Household (HH) survey, Focus Group Discussions (FGDs) (Figure 3) and Key Informant Interviews (KIIs) (Figure 4), 5% of the population was considered dependent on toilets discharging directly to open drains (T1A1C6).

4.2 Onsite Sanitation Systems (OSS)

In absence of any kind of sewerage system in the ward, 93% of the population is dependent on Onsite Sanitation Systems (OSS). There is no Sewage Treatment Plant in the city.

Containment

Since it was difficult to examine the containment because of the closed drains hence different techniques were adopted. According to HH survey, FGDs with swach saathis and officials, it was observed that there are six types of containment systems in Odagaon: septic tanks connected to soak pits, septic tanks connected to open drains (Figure 7), septic tanks connected to open ground, fully lined tanks connected to open drains, lined pits with semi-permeable walls and open bottom (Figure 6) and unlined pits (Figure 8).



Figure 6: Pit with semi-permeable walls and open bottom (Source: Dimple Behal/CSE).



Figure 7: Septic tank connected to open drain, Ward 3 (Source: Dimple Behal/CSE).



Figure 8: Pit latrine connected to unlined pit (Source: Dimple Behal/CSE).

6% of the population is dependent on septic tanks connected to open drain (T1A2C6)⁴, 15% on fully lined tanks connected to open drain (T1A3C6)⁴, 22% on septic tanks connected to soak pit (T2A2C5)⁴, 10% on septic tanks connected to open ground (T1A2C8)⁴, unlined pits being 30% (T1A6C10)⁴ and 10% on lined pits with semi-permeable walls and open bottom, no outlet or overflow (T1A5C10)⁴. The size of containment system depends on space availability and affordability of households. Whether it is a fully lined tank or septic tank, both are locally known as septic tank⁵. Also, whether it is lined or unlined pit, it is considered as pit. During the sample household survey, it was found that in Ward number 3 of the city, the few households have their toilets connected directly to the open drains and open ground. It has been also observed that there are pits which are insanitary in nature. The containments in Ward number 3 are unlined pits with semi-permeable walls and open bottom and unlined pits, too. As observed, the residents of such place live in semi-pucca housing. Also, based on household survey, around 1,200 housing units have been developed under Pradhan Mantri Awas Yojana (PMAY) by providing them with septic tanks connected to a soak pit. Also, since there is no significant risk of groundwater, people prefer constructing septic tanks connected to soak pits⁶.

Odagaon has one community toilet and five public toilets (Figure 10). Currently, only four toilets are operational, one is getting repaired and hence, not getting used. Despite being declared as an Open Defecation Free (ODF) city, instances of open defecation are still prevalent in Odagaon.



⁴Based on household surveys, Focus Group Discussions, and data collected from NAC.

⁵As per the KII with Junior Engineer, Odagaon.

⁶As less than 25% of sanitation facilities are located <10m from groundwater sources and less than 25% are located uphill of groundwater sources with a depth of groundwater of 5-10m being prevalent fine sand and clay.

Figure 9: Containment Outlet in Open Drain
(Source: Dimple Behal/CSE).

Figure 10: Public Toilet in Odagaon (Source: Dimple Behal/CSE).

According to officials, rare cases of open defecation can be attributed to behavioural issues but field observation shows that lack of daily and periodic maintenance of the public/community toilets contribute to open defecation in the city.

Emptying

The local body has one vacuum tanker of 2,500 litres capacity (Figure 12). HHs in Odagaon usually get their tanks emptied with a frequency of 7 to 8 years. All the sanitary workers of the NAC use Personal Protective Equipment (PPE) like gloves, boots and mask during emptying of OSS and cleaning of drains. The user fee for mechanized emptying is 750INR (US\$ 10.1) for households and 850INR (US\$ 11.5) for commercial areas. Based on the sample household survey and FGDs with emptiers, it was concluded that 50% of population is using their systems with emptying (Figure 11). Thus, variable F3 for all sanitation systems was set to 50%.



Figure 11: Septic tank emptied by cesspool
(Source: Dimple Behal/CSE).



Figure 12: Vacuum tanker, NAC (Source: Dimple Behal/CSE).

Transportation

The faecal sludge emptied mechanically using a vacuum tanker gets transported to a newly constructed Faecal Sludge and Septage Treatment Plant (FSSTP) (Figure 14). The tanker has to cover a distance of 14 to 16 km for a round trip. There is no leakage or spillage during transportation of FS through the vacuum tanker. Supernatant (SN) is conveyed through open drains in the ward, which finally converge into a major *nullah* and eventually terminating in the Kusumi River. Based on FGDs with desludgers, it was estimated that 80% of the faecal sludge emptied is getting delivered to the treatment plant. Thus, variable F4 from all sanitation systems was set to 80%. Since no supernatant is delivered to any treatment facility, variable S4e for systems T1A2C6 and T1A3C6 is considered zero.

Treatment

Odagaon has a newly constructed FSSTP with a treatment capacity of 10 Kilo litres per day (KLD). The entire amount of mechanically emptied faecal sludge is received at the FSTP (Figure 13). There is no treatment of the supernatant and the grey water flowing in the open drains. Depending upon the irrigation requirement of the crops, farmers often draw this mixture

of supernatant and grey water from the big and small *nullahs* passing through their agriculture fields. Since all the faecal sludge that is delivered to the FSSTP facility is getting treated, variable F5 is considered as 100% for all sanitation systems. Supernatant is being discharged untreated, so variable S5e for systems T1A2C6 and T1A3C6 is taken as zero.



Figure 13: Discharging of FS at FSSTP (Source: Dimple Behal/CSE).



Figure 14: FSSTP Odagaon (Source: Dimple Behal/CSE).

5 Data and assumptions

The availability and accessibility of data:

- Two key sources of data are used: Census of India, 2011 and data provided by officials of NAC. Most of the data are then updated by Key Informant Interviews (KIIs), Focused Group Discussions (FGDs) and field observations.
- Data on containment is available in Census but have been updated based on FGDs and KIIs. Data on emptying and transport have been collected by KIIs. However most of the data are qualitative.
- Since most of the drains within NAC were closed, it was difficult to identify the containment and outlet. Hence, the data relied on KIIs, FGDs and data provided by officials.

Assumptions followed for preparing the SFD graphic:

- 80% of the volume of water supplied was considered as wastewater generated.
- The proportion of FS in septic tanks, fully lined tanks and lined tanks with open bottom/all types of pits is considered 100%, 50%, and 100% respectively, as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.
- The OSS proportion for emptying (variable F3) was considered as 50% assuming a benchmark of 10 years in which emptying has to be done. So, the households emptying their systems in less than 10 years were considered emptied, which happened for half of the households surveyed.
- Since one of the public toilet is not functional, the people dependent are generally going for open defecation counting to 2% of the population's proportion.

6 Context-adapted SFD Graphic

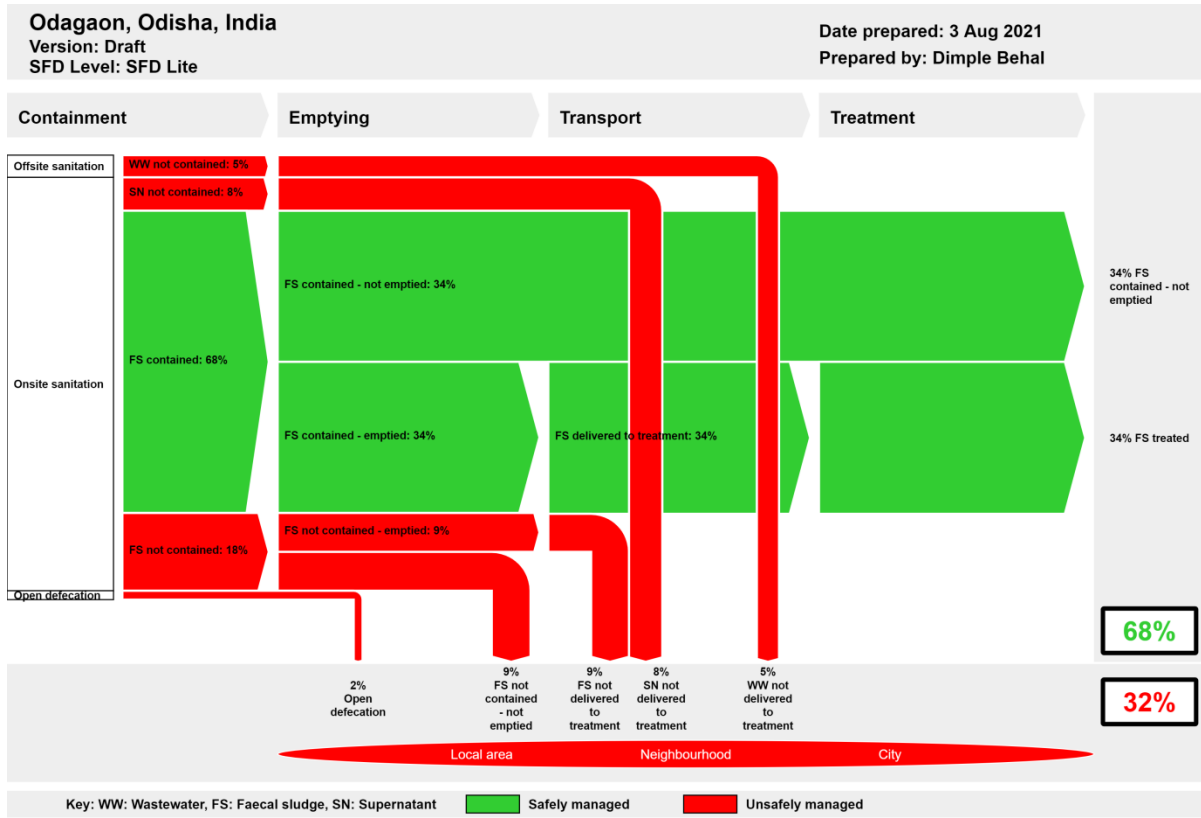


Figure 15: Context-adapted SFD Graphic for Odagaon (Source: Dimple Behal/CSE).

The only difference suggested in the context-adapted SFD graphic is at containment stage for correctly designed septic tanks, though connected to open drains. The supernatant generated from the septic tank connected to open drain are not contained and hence considered to be unsafely managed as Supernatant (SN) not delivered to treatment (represented in red colour giving 8%). The solid FS collected in the septic tanks is considered to be contained and hence, 68% of FS is contained (represented green in colour at containment stage). Followed by this, 30% of FS contained is emptied, and the remaining 34% is FS remaining in the tanks which is contained and never emptied. Overall, excreta of 32% of the population is not managed safely according to the context-adapted SFD graphic.

7 List of data sources

Reports and literature

- District Census Handbook 2011 (Houses and household amenities and assets table HH-08: percentage of households by availability of the type of Latrine Facility <http://censusindia.gov.in/DigitalLibrary/MFTableSeries.aspx>)
- District Census Handbook 2011 (Population Census Abstract Data Table (India & State/UTs-Town/Village/WardLevel) http://censusindia.gov.in/2011census/population_enumeration.html)
- CGWB.2013. Groundwater information booklet South eastern region of Odisha(Nayagarh): Central Ground Water Board, Ministry of Water Resources, River Development and Ganga Rejuvenation
- CGWB. 2019-2020. Groundwater Year Book. South eastern region, Bhubaneswar: Central Ground Water Board. Ministry of Jal Shakti, River Development and Ganga Rejuvenation
- Swachhta Sarvekshan 2021, Ministry of Housing and Urban Development
- Detailed Project Report of Faecal Sludge Treatment Plant in Odagaon, 2020 prepared by OWSSB
- Strategy cum operative guidelines on faecal sludge and septage management, 2020

Field Visits

- Survey of Public toilet (1 nos.), and community toilets (5 nos.)
- Visit to Septage Treatment Plant at Jaringji, Odagaon
- Visit to approximate 100 households covering Slums, Lower Income Groups (LIG), Middle
- Income Groups (MIG) and Higher Income Groups (HIG) spread throughout the NAC
- Wastewater tapping locations of Odagaon
- Faecal sludge discharge sites

Key Informant Interviews (KIIs)

- Executive Officer, Odagaon NAC
- Junior Engineer, Odagaon NAC
- Sanitation Expert, Odagaon NAC
- MIS, Odagaon NAC

Focus Group Discussions (FGDs)

- Ward Swach supervisors
- Residents
- Swach saathis

- Sanitation Workers

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