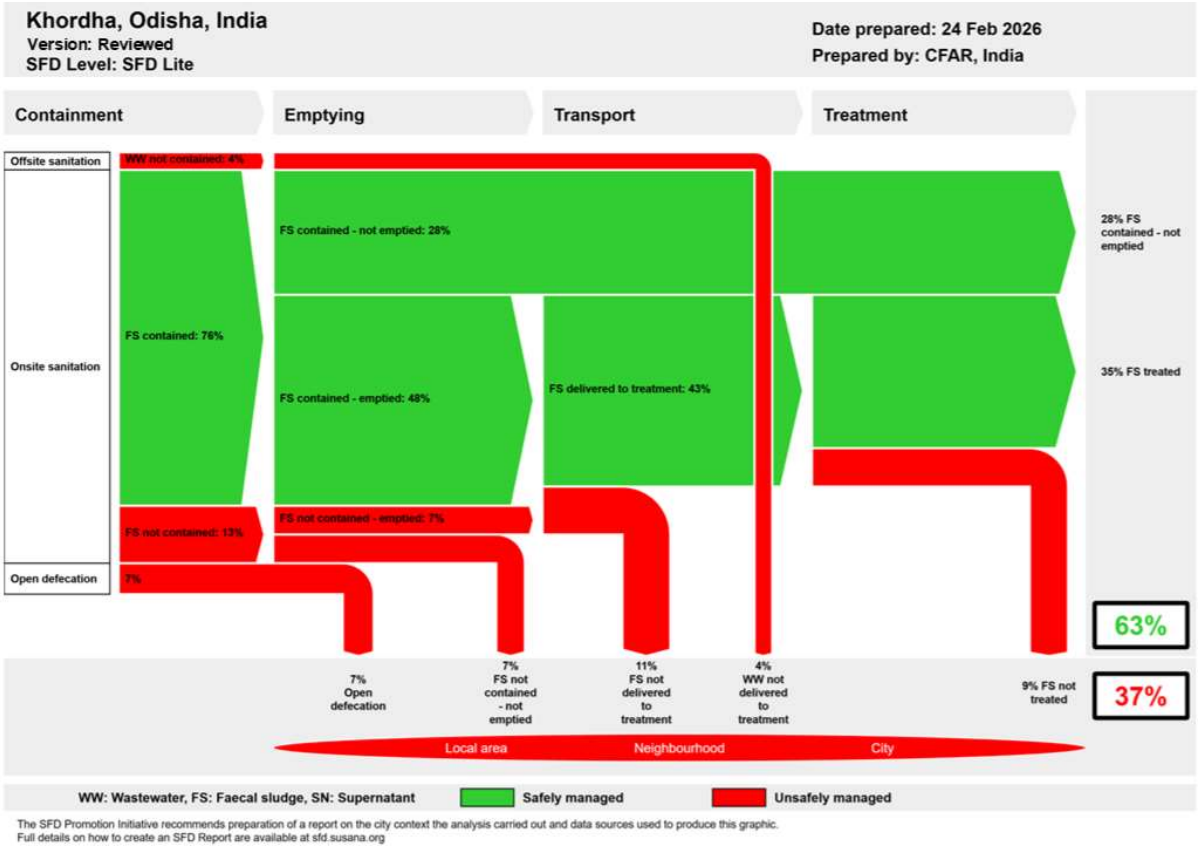
# SFD Lite Report

# Khordha
# India

This SFD Lite Report was prepared by
Centre for Advocacy and Research (CFAR)

Date of production/ last update: 24/02/2026

# 1 The SFD Graphic




**SFD Graphic for Khordha.**

# 2 SFD Lite information

**Produced by:**

- Centre for Advocacy and Research (CFAR), New Delhi
- This report is compiled as part of the project entitled "*Bridging the Urban Sanitation Gap in the Small Towns in India: Khordha & Jatni in Odisha and Chaksu & Dausa in Rajasthan,"* funded by the Viega Foundation, Germany. We would like to express our sincere gratitude to Ms. Rizwana Kawkab, Executive Officer; Mr. Debashis Baral, Sanitation Expert, Khordha Municipality; Er. Mayadhara Behera, Manager, WATCO; and Mr. Prasanta Biswal, Supervisor, Khordha FSTP, for providing the required information, secondary data and their cooperation during KIIs. We are also thankful to household residents, CT/PT caretakers, mason and private desludging operators for their cooperation and valuable inputs.
- Our appreciation extends to the field team members Ms. Labanyarekha Rout, Ms. Soumyashree Paikaray, Ms. Chinmayee Sahoo, Ms. Sunita Pradhan for their efforts in conducting household surveys, KIIs and field visits. Special thanks to Ms. Akhila Sivadas for her guidance in shaping the study and Viega Foundation team for technical support.
- We also acknowledge the support of the Centre for Science and Environment (CSE) team, especially Mr. Harsh Yadava, Mr. Sarim, Dr. Sumita Singhal, and Mr. Subrata Chakraborty, for their continuous guidance throughout the process.

**Collaborating Partner:** Khordha Municipality, Odisha

**Date of Production:** 24.02.2026

# 3 General city information

Khordha, located in eastern Odisha, serves as the district headquarters. The town is situated strategically along NH-16, linking Bhubaneswar and Berhampur. This corridor has strengthened the town's administrative role, economic activities, and regional connectivity. Historically, Khordha was the last stronghold of the Odisha Kingdom and retains cultural and administrative significance. The town has transitioned from an agrarian base to a regional service and administrative hub, influenced by rail connectivity, institutional growth, the presence of an industrial zone, and integration with the expanding Bhubaneswar metropolitan region.

Geographically, the town lies at 20°15′ N latitude and 85°37′ E longitude. The climate is tropical monsoon, with temperatures ranging from 10°C in winter to 42°C in summer and an average annual rainfall of 1,466.5 mm, primarily from the southwest monsoon[1]. Due to its proximity to the coast, Khordha is frequently affected by cyclonic events.

The municipal area covers 25.84 sq. km. and is divided into 22 wards, governed by Khordha Municipality. As per the Census 2011, Khordha had a population of 46,205 residing across 9,113 households[2]. The town has a total of 25 notified slums, including 9,741 slum residents (21.08%). Though the local ULB does not have any current comprehensive demographic survey data, they are assuming 1% population growth per year and considering 65,000 as the recent demographic figure of the town (KII-1, 2025)[3]. However, an estimated total population of 58,911 is calculated based on the previous annual growth rate (1.83% every year since 2011). This figure is taken into consideration for preparing the Shit Flow Diagram of the town. Table 1 shows the population growth for the town.

**Table 1:** Population Growth of Khordha Town. *Estimated population (Source: Census, 2011).

| Census Year | Population | Growth Rate (%) |
|---|---|---|
| 1991 | 30,591 | 36.6 |
| 2001 | 39,054 | 27.7 |
| 2011 | 46,205 | 18.31 |
| 2025* | 58,911* | 27.5 |

Current population growth is driven by peri-urban development, transport infrastructure development, residential expansion, and employment ties to Bhubaneswar. The town hosts an estimated daily floating population of around five thousand, underscoring its role as a commuter and service centre in the regional urban network[4]. As per the Swachh Survekshan city report card 2024-2025, the town ranks 69th in the state and 725th in the national ranking (small cities category: 20 – 50 thousand population)[5].

[1] District Survey Report, 2020
[2] District Census Handbook Khordha, 2011
[3] KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality)
[4] ULB Website http://www.khordhamunicipality.in/About.aspx
[5] Obtained from Swachh Survekshan Report, 2024-25

# 4 Service outcomes

## 4.1 SFD matrix

Table 2 shows the SFD matrix for Khordha.

**Table 2**: SFD Matrix for Khordha.

**Khordha, Odisha, India, 24 Feb 2026. SFD Level: SFD Lite**
**Population: 58911**
**Proportion of tanks: septic tanks: 100%, fully lined tanks: 100%, lined, open bottom tanks: 100%**

| Containment | | | | | | |
|---|---|---|---|---|---|---|
| System type | Population | WW transport | WW treatment | FS emptying | FS transport | FS treatment |
| | Pop | W4c | W5c | F3 | F4 | F5 |
| 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 |
| T1A1C6<br>Toilet discharges directly to open drain or storm sewer | 4.0 | 0.0 | 0.0 | | | |
| T1A2C5<br>Septic tank connected to soak pit | 13.0 | | | 75.0 | 80.0 | 80.0 |
| T1A3C5<br>Fully lined tank (sealed) connected to a soak pit | 26.0 | | | 75.0 | 80.0 | 80.0 |
| T1A4C10<br>Lined tank with impermeable walls and open bottom, no outlet or overflow | 37.0 | | | 50.0 | 80.0 | 80.0 |
| T1B11 C7 TO C9<br>Open defecation | 7.0 | | | | | |
| T2A4C10<br>Lined tank with impermeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution | 13.0 | | | 50.0 | 80.0 | 80.0 |

### 4.1.1 Offsite sanitation

Khordha town lacks a conventional sewerage network and a city-level wastewater treatment facility (KII-1, 2, 2025)[6]. At present, off-site sanitation services are limited to the conveyance of wastewater through surface drainage systems, without any provision for treatment. The town's drainage infrastructure consists of five stormwater drains[7] and two natural drainage channels, e.g. Chachera Canal and Jari Canal (KII-1, 2025)[8]. Household wastewater is conveyed through small lateral drains connected to the stormwater drains, resulting in the combined flow of stormwater and domestic wastewater being discharged into the natural drains. Downstream, these flows ultimately spread into agricultural lands and open areas.

[6] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality) Er. Mayadhara Behera (Manager, WATCO)
[7] SBM-urban portal https://sbmurban.org/state-city?id=801855
[8] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality)

The prevalent drainage system in Khordha is predominantly open in nature[9], although certain stretches have covered drains. Field observations revealed that many covered drain sections are inadequately maintained, leading to blockages and reduced conveyance capacity[10]. During rainfall events, these blockages cause wastewater and stormwater to flow on the roads and public spaces, indicating poor operational performance of the drainage network.

***Figure 1***: a. uncleaned open drain; b. closed drain overflowing on the street due to blockages, c. open drainage to agricultural field (Source: Chinmayee, Bulton, CFAR. 2025).

To improve stormwater management, the municipality has recently prepared a Detailed Project Report (DPR) for drainage infrastructure. Its implementation is expected to begin shortly (KII-1, 2025)[11]. An interview with the official from the Water Corporation of Odisha (WATCO), which manages the drinking water supply and sewerage in Odisha, revealed that there is currently no proposal for a city-wide sewage treatment plant. However, he mentioned WATCO has initiated planning for a Sewage Treatment Plant (STP) exclusively to serve Khordha Hospital. The type and capacity of the proposed facility are yet to be finalized and will be determined based on ongoing assessments, following which a DPR will be prepared (KII-2, 2025)[12]. No infrastructure is planned to treat the town's domestic wastewater.

Regarding the drinking water supply, water is sourced from the Munduli Dam, treated by WATCO, and distributed across the town. Total inlet water for Khordha town is 9.27 KL per day[13]. Households primarily depend on municipality supplied water, with approximately 78% of households relying on the municipal water supply, while others use alternative sources such as borewells, wells, hand pumps, or public standposts[14].

During the field survey, it was observed that in Ward No. 13, at Baseli Sahi, which is characterized by a compact and dense settlement pattern, space constraints have led to the absence of proper containment systems in several households. In such households, toilet outlets are directly connected to open drains, resulting in non-contained systems and unsafe discharge of faecal waste. Therefore, the T1A1C6 system was considered 4% of the total population of the town while generating the SFD graphic, which was also verified from the interview with the municipality official[15].

[9] District Census Handbook, 2011
[10] Based on the observations from the field
[11] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality)
[12] As per KII with Er. Mayadhara Behera (Manager, WATCO)
[13] Same as above
[14] Based on the findings from the Household Survey
[15] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality) and Er. Mayadhara Behera (Manager, WATCO), Khordha town never had any sewer network. The figures mentioned in the census were not in reality. Hence, T1A1C6 is considered based on the household survey and triangulated with various KIIs.

***Figure 2***: Toilet outlet directly connected to an open rain, and drain water discharged into open grounds (Source: Soumyashree & Bulton, CFAR. 2025).

### 4.1.2 Onsite Sanitation

**Containment:**

In the absence of an off-site sanitation system, the majority of Khordha town's population depends on on-site sanitation systems (OSS). Based on household survey findings and key informant interviews with municipal sanitation experts, WATCO officials, desludging operators, and local masons, it is estimated that approximately 89% of the total population relies on OSS.

Out of the 89% of the population dependent on OSS, 13% have a properly built septic tank, and 26% have a fully lined tank (FLT). Both containment types are connected to a soak pits. Septic tanks and fully lined tanks are generally square or rectangular in shape, with average dimensions of 5-10 feet in length, 4-6 feet in width, and 8-10 feet (up to 12 feet) in depth[16]. Septic tanks are predominantly two-chambered.

***Figure 3***: a. Septic tank; b. outlet connected to soak pits; c. a fully lined tank with soak pit; d. FLT under construction. (Source: Bulton, CFAR. 2025).

Another predominantly used containment system is lined tanks with semi-permeable walls and an open bottom with no outlet/overflow, used by 50% of the total population. These structures are either square and rectangular in shape, built with brick walls, or made up of circular rings, locally referred to as Nonda. Ring tanks are typically constructed using prefabricated concrete rings, stacked one over another with cemented joints. The average size of these tanks ranges from 3-4 feet in diameter and 3-8 feet in depth, extending up to 12 feet in some cases, with 6-8 rings commonly used depending on household requirements[17].

[16] Based on the household survey findings
[17] Based on the household survey findings, the CPHEED (2018) guidelines are not followed in the field

***Figure 4***: Existing containment systems (Source: Chinmayee & Sunita, CFAR. 2025).

Field surveys and official interviews indicate that ring-tanked latrines are mostly built by lower-income groups in Sahi areas, while fully lined tanks and septic tanks are more commonly constructed by medium and higher-income families, located mostly in the colony areas (KII-1, 2025)[18]. Hence, the selection of containment systems is largely influenced by household income levels, family size, and the availability of space. Containment structures in some households could not be accessed for inspection, as permanent structures have been constructed over the tanks or pits. To meet the accessibility of individual household toilets, Khordha Municipality has constructed 2,808 subsidized toilets under SBM[19].

However, there is no strict standardized regulation or technical monitoring governing the design, sizing, or construction of containment systems across the town (KII-1, 2025)[20]. The absence of standardized construction practices and oversight suggests variation in the uses and performance of the different containment systems. Therefore, a significant share of on-site containment systems in Khordha town functions as partially contained or non-contained systems, a condition that is reflected in the SFD graphic.

### Community Toilets and Public Toilets

Khordha town has a total of 9 community toilets (CTs) and 10 public toilets (PTs)[21]. Out of which 3 CTs and 6 PTs are non-functional. On average, these CTs and PTs serve 600-700 and 200-250 people per day[22]. The majority of these toilet facilities are connected to large lined tanks. The size of the tanks varies across locations, based on the number of users, with an average dimension of approximately 6-10 ft. × 5-8 ft. × 6-12 ft. Public toilets are primarily managed by Self-Help Groups (SHGs), whereas community toilets are operated and maintained by local community members. Average desludging frequency for public toilets ranges between 1 and 2 years, while for community toilets it extends up to 5 to 6 years, sometimes more (KII- 4, 5, 2025)[23].

Public toilets are generally observed to be better maintained. However, limited water storage capacity often disrupts their regular functioning[24]. In high-footfall areas, particularly near market zones and the bus stand, waterlogging was observed at the entrance of the public toilets.

[18] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality) and field visit
[19] IHHL under SBM figures obtained from the municipality
[20] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality) and field visit
[21] Based on the field survey
[22] Obtained from the interview with different toilet caretakers
[23] As per KII with Mrs. Anusuya Behera (In-charge, PT) and Mr. Rajesh Nayak & Kanhu Nayak (Caretaker, CT)
[24] Based on the field observation

***Figure 5***: a. water accumulated in front of PT, ward no. 11; b. Well-maintained PT at ward no. 5; c. Leakages in the containment, CT, ward no 8. (Source: Bulton, CFAR. 2025).

Open urination outside the premises of public toilets was also noted. In the case of community toilets, overflow from containment systems and visible seepage were observed during the field survey. The toilet caretakers reported that emergency desludging is occasionally required due to these recurring overflow issues, which they previously carried out by themselves manually, followed by disposal of sludge in adjacent low-lying land (KII-5, 2025)[25].

Although Khordha town has been declared ODF, the household survey revealed continued open defecation in select slum clusters, particularly in Wards 2, 6, 9, 10, and 11, mainly among poor and low-income households lacking individual toilet facilities. Key drivers include affordability constraints, limited subsidy support, non-availability of nearby public toilets, and strong behavioural factors, with safe sanitation often deprioritized. The practice of open defecation has also been acknowledged by the municipal officials[26]. Hence, based on triangulation of household survey findings, KIIs with officials and desludgers, and SBM-IHHL data and the 2011 census open defecation figures, the prevalence of open defecation was calculated at 7%.

***Figure 6***: Open defecation field at Bhaliabadi Sahar Sahiward no. 10. (Source: Bulton, CFAR. 2025).

## Emptying and Transportation

Khordha town predominantly relies on mechanized private desludging operators for emptying and transportation of faecal sludge from on-site sanitation systems to the treatment facility. As per the ULB official, presently, two ULB owned cesspool vehicles are operating in the town for desludging (KII-1, 2025)[27]. During the discussion with the private desludging service provider (Om Sai Services), it was reported that out of these two vehicles, one with a capacity of 3,500 litres is operated and maintained by him under a seven-year municipal tender and officially licensed under ULB (KII-6, 2025)[28]. Another vehicle, with a capacity of 4,000 litres, is operated by a different service provider. Occasionally, other licensed vehicles from Bhubaneswar Municipal Corporation (BMC) and Jatni Municipality, along with 4-5

[25] As per the KII with Mr. Rajesh Nayak & Kanhu Nayak (Caretaker, CT, ward no. 8)
[26] Mr. Debashis Baral (Sanitation Expert, Khordha Municipality) has acknowledged the practice of OD in some pocket areas.
[27] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality)
[28] As per KII with Mr. Ashis Kumar Jena (Private Desludging Operator)

unlicensed vehicles, also serve the town (KII-1,3,6, 2025)[29]. On average, 4 to 5 desludging trips are conducted per day.

According to the ULB, the government charges INR 1,100 (USD 12) per trip, but for affordable flexibility, the ULB has no control over the cesspool operator[30]. The owner of Om Sai Operator has informed that they charge INR 950 (USD 10.36) for desludging services within the municipal limits. For desludging services provided in nearby rural areas, an additional charge of INR. 20 per km is imposed (KII-6, 2025)[31].

The cesspool vehicles are equipped with mechanised pumps, storage tanks, and hoses extending up to 200 metres to facilitate desludging in households in congested areas with narrow access lanes. The desludging operation is typically carried out by a team of three workers, comprising one driver and two helpers. Personal protective equipment (PPE), such as masks, gloves, and boots, is used as a safety measure during operations. On average, the desludging process takes between 30 minutes and 1 hour per containment system. These services are provided on an on-demand basis. Households place desludging requests through the Sujan registration system, and services are generally delivered within three days.

**Figure 7**: a. IEC promoting safe sanitation & workers' safety at FSTP wall; b. cesspool vehicle emptying PT containment; c. Advertisement of Private Desludging Service Operators (Source: Bulton, Soumyashree, CFAR. 2025).

## Treatment and Disposal

At present, Khordha town does not have a wastewater treatment plant. However, for faecal sludge treatment, the town is served by a designated FSTP with a capacity of 20 KLD. The FSTP is located at Bibha Vihar, Ward No. 1, and is operated and managed by the Trinath Dakua Self-Help Group. The plant is based on anaerobic treatment technology and is reported to be operating at full capacity, receiving approximately 4 to 5 cesspool vehicles per day (KII-3, 2025)[32].

The FSTP functions throughout the year and is supported by a municipal piped water supply as well as an independent borewell to meet its operational water requirements. A backup generator is also available to ensure uninterrupted functioning during power outages. However, during discussions with private desludging operators, it was reported that due to capacity constraints at the FSTP, faecal sludge is occasionally disposed of on their own private plot located approximately 5 km away from the town. Disposal in nearby village areas was also reported, particularly when desludging services are provided in rural settlements (KII-6, 2025)[33].

[29] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality), Mr. Prasant Biswal (Plant Supervisor, FSTP Khordha), and Mr. Ashis Kumar Jena (Private Desludging Operator)
[30] As per KII with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality)
[31] As per KII with Mr. Ashis Kumar Jena (Private Desludging Operator)
[32] As per KII with Mr. Prasant Biswal (Plant Supervisor, FSTP Khordha)
[33] As per KII with Mr. Ashis Kumar Jena (Private Desludging Operator)

***Figure 8***: a. Cesspool vehicle unloading septage at the FSTP, b. treated sludge over the drying chamber, c. stockpiled bio-solid (Source: Bulton, Labanya. CFAR. 2025).

The treated effluent (blackwater) from the FSTP is reused for plantation within the plant premises. The treated sludge is utilized for non-food crop cultivation and, in some instances, for landscaping purposes in municipal parks. The treated outputs are not used for any commercial agricultural purposes.

## 4.2 SFD Graphic

Figure 9 shows the SFD graphic for Khordha.

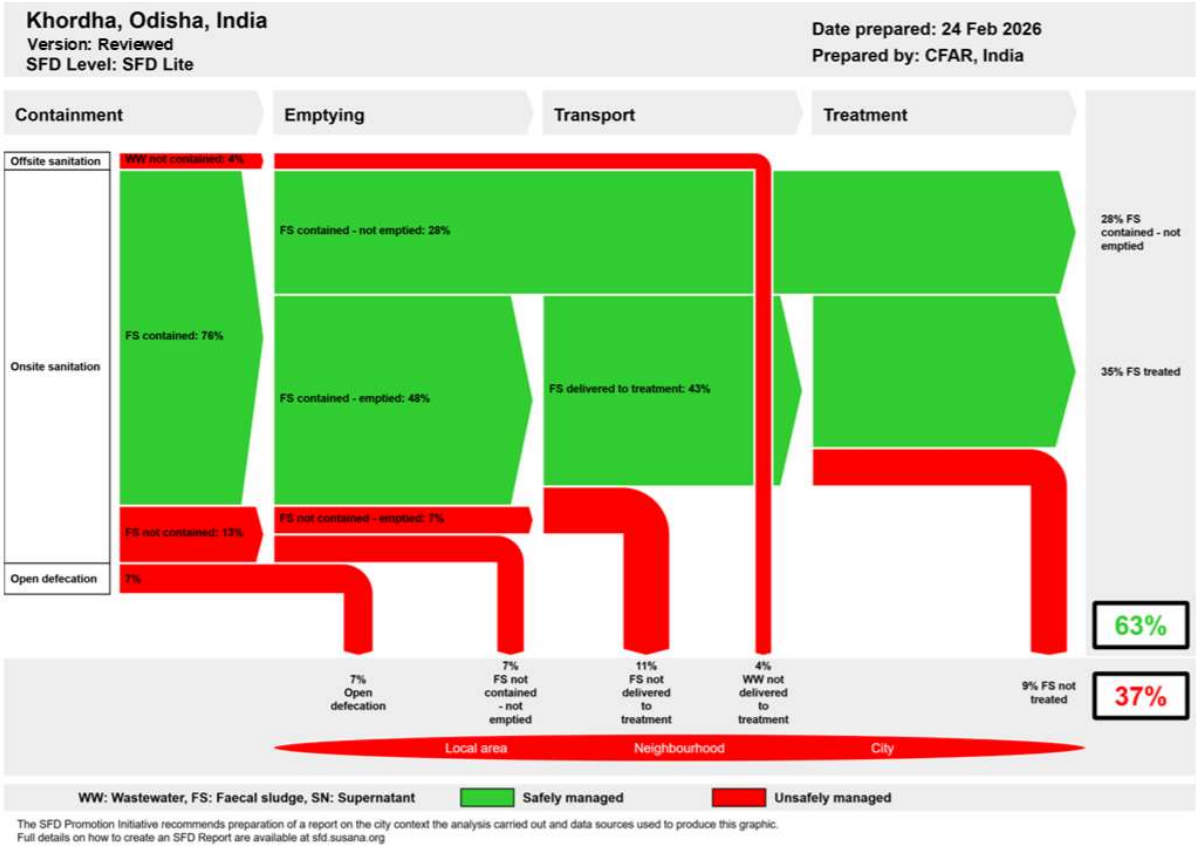



**Figure 9: SFD Graphic for Khordha.**

The outcome of the SFD graphic shows that 63% of the excreta flow is classified as 'Safely Managed' while 37% of all excreta flow is classified as 'Unsafely Managed' (see SFD graphic). The unsafely managed excreta originates from Faecal Sludge (FS) not delivered to the treatment plant (11%), Wastewater (WW) not delivered to treatment (4%), FS not contained-not emptied (7%), FS not treated (9%) and Open defecation (7%).

The safely managed excreta originate from FS that is contained and not emptied (28%), and FS treated (35%). However, the safely managed FS generated by this 28% of the population is temporary since FS from their onsite sanitation systems will require emptying services in the short and medium term as they fill up.

# 5 Data and assumptions

- Secondary data is taken from the census of 2011, which was used as a reference for the detailed analysis, and IHHL figures are collected from the municipality.
- Primary data is obtained from the key interviews with different stakeholders, site visits, and household surveys.
- The current population is estimated based on the 2011 census population figure and the available previous decadal growth rate (18.3). It was assumed to be 1.83% as the annual growth rate since the 2011 census, contributing to a total 27.5% growth for the last 15 years.
- The proportion of FS in septic tanks, fully lined tanks, and lined, open bottom tanks are considered 100%, 100%, and 100% respectively as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.
- Faecal sludge generation by a person per year is considered to be 120 litres.
- The proportion of OSS emptied is considered to be 75% for septic tanks and fully lined tanks (as calculated using the septage generation method), and two-thirds of the calculated value (50%) is considered for lined tanks with semi-permeable walls and open bottoms, as observed in the survey.
- The proportion of faecal sludge transported to the treatment plant is assumed to be 80% based on the instances of practicing illegal dumping by desludgers and emptying by the vehicles coming from different areas.
- The proportion of treated faecal sludge after transporting to the treatment plant is assumed to be 80% based on the site observation of the treatment plant and the quality of the treated water colour and KII with the plant staff.
- Based on the field survey, it is assumed that 25% of the total population dependent on the lined tanks with open bottoms have a higher risk of groundwater contamination due to their location in low-lying areas and close to the water bodies.

# 6 List of data sources

### Reports and Literature

- District Census Handbook 2011 for Khordha (Available at https://censusindia.gov.in-/nada/index.php/catalog/950)
- Households by availability of type of latrine facility, Odisha-2011 (Available at https://census-india.gov.in/nada/index.php/catalog/8668)
- Swachh Survekshan Report (Available at https://ss2023.sbmurban.org/#/scorecard)
- Odisha Urban Sanitation Policy, 2017
- District Survey Report (DSR), 2020 (Available at https://khordha.odisha.gov.in/sites/-default/files/2023-06/2021021290.pdf)
- Standard Operating Procedure (SOP) for Cleaning of Sewers and Septic Tanks, 2018. CPHEEO, MoHUA (Available at https://sbmurban.org/toilet-2.0)

### Key Informant Interviews

- KII-1, 2025; Interview with Mr. Debashis Baral (Sanitation Expert, Khordha Municipality)
- KII-2, 2025; Interview with Er. Mayadhara Behera (Manager, WATCO)
- KII-3, 2025; Interview with Mr. Prasant Biswal (Plant Supervisor, FSTP Khordha)
- KII-4, 2025; Interview with Smt. Anusuya Behera (In-charge Public Toilet, Ward No. 11)
- KII-5, 2025; Interview with Mr. Rajesh Nayak & Kanhu Nayak (caretaker, community toilet, Ward No. 8)
- KII-6, 2025; Interview with Mr. Ashis Kumar Jena (Private Desludging Operator)

### Field Visit

- Field survey of public and community toilets (2 PT/CTs)
- Visit to FSTP plant
- Visit to waste water discharge locations
- Visit to 90 households with randomly selected low, medium and high-income families across the town.
- Visit to different slum areas across the town
- Visit to open defecation sites

Khordha, India, 2026

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