Annex A: Global indicators for monitoring SMOSS

Guidance for monitoring safely managed on-site sanitation (SMOSS)

WHO and UNICEF, 2025

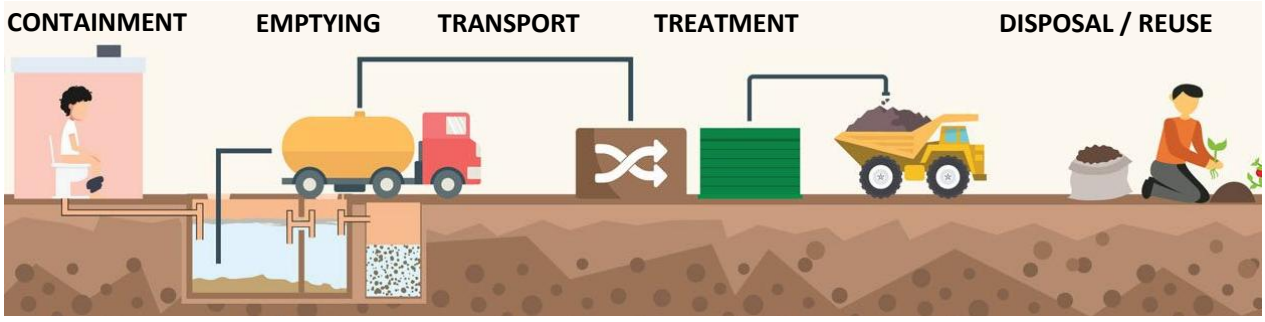
Background

These annexes accompany the Guidance for Monitoring SMOSS to provide additional details on indicators, core and expanded questions and tools for designing monitoring systems to collect data for SDG 6.2.1. These annexes have been developed as part of the Monitoring SMOSS pilot project and are informed by the pilots conducted in ten countries as part of this project as well as other global examples of monitoring of safely managed sanitation services. The annexes are split into the following documents and are available with the main guidance at https://washdata.org/monitoring/sanitation/safely-managed-on-site-sanitation

A. Global indicators for monitoring SMOSS
B. Data collection – Household questionnaire
C. Data collection – household sanitation inspections
D. Data collection - Service authority and service provider surveys
E. Analysis to inform national estimates for SDG 6.2.1

Annex A - Global indicators for monitoring SMOSS

This Annex provides detailed definitions of SMOSS indicators and how they relate to the sanitation service chain, a decision tree to guide the classification process, key ratios and formulas used to calculate estimates and a summary of recommended data sources, from household surveys to service provider records. By clearly outlining what qualifies as safely managed at each step, this annex can inform the review and adaptation of national survey tools and indicators, identify gaps or inconsistencies in current classifications; and harmonize national data with JMP global monitoring standards.



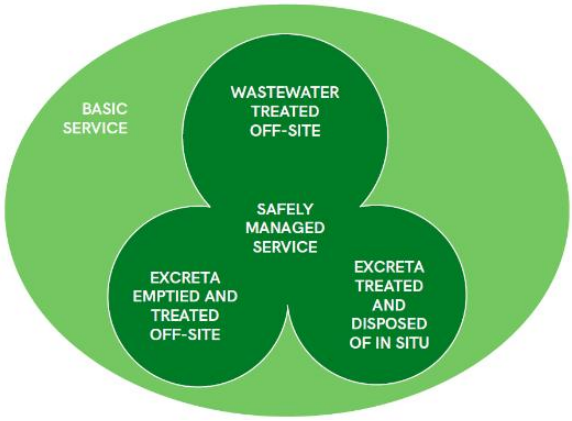
Sanitation service chain (Source: https://www.fsmtoolbox.com/)

A. Global indicators for monitoring SMOSS

The World Health Organization (WHO) and United Nations Children's Fund (UNICEF), through the Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene, track progress towards the SDG targets 6.1 and 6.2. Sanitation is monitored against the "service ladder" (Figure A 1), which can be applied to all countries with different levels and types of sanitation. To be considered safely managed sanitation under SDG 6.2 requires that people use improved sanitation facilities that are not shared with other households (equivalent to the basic service level), and that the excreta produced should be managed through one of the three pathways shown on the right of the ladder.

Figure A 1. JMP ladder for sanitation services (left) and three pathways to safely managed services (right)

SERVICE LEVEL	DEFINITION
SAFELY MANAGED	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or removed and treated off-site
BASIC	Use of improved facilities that are not shared with other households
LIMITED	Use of improved facilities that are shared with other households
UNIMPROVED	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines
OPEN DEFECATION	Disposal of human feces in fields, forests, bushes, open bodies of water, beaches or other open places, or with solid waste



***Note**: Note: Improved facilities include: flush/pour flush toilets connected to piped sewer systems, septic tanks or pit latrines; pit latrines with slabs (including ventilated pit latrines); and composting toilets.*

JMP has defined **global indicators** for monitoring SDG 6.1 and 6.2 to allow a consistent assessment approach across countries with comparable indicators and adequate existing national data. Only a select few criteria currently meet these requirements for inclusion in the definition of the SDG 6.2.1a indicator. These global indicators are presented in Table A 1 with a detailed definition included in Table A 3. The **ratios** (Table A 2) and **decision tree** (Figure A 2) provide the approach to analyze this data across each step of the service chain for on-site sanitation (containment, emptying, transport, treatment) and how these are used to inform estimates of the population using SMOSS. The tables in the subsequent annexes (Annex B-D) provide suggested **core questions** for the different **data collection methods** that inform the global indicators.

As part of their national commitment to the SDGs, all countries should be able to report against these core indicators. However, it is recognized that they do not capture all aspects of safety and there are potentially many **local indicators**, that countries may decide to monitor depending on their national sanitation policies, context, and resources. Example **expanded questions** to inform local indicators are also presented for each data collection method in the other annex documents

A.1 Global indicators

This section summarises the global indicators for monitoring SMOSS and the principal core questions that inform them. A further explanation of global vs local indicators is provided in the main guidance document. The Phase 1 pilot synthesis report provides additional details on the basis for each indicator and reflections from the findings of the phase 1 pilots.

Table A 1. Global indicators and core questions for monitoring SMOSS in SDG 6.2

Indicator	Definition: the proportion of the population using…	Core questions[1]
S1	No sanitation facility (open defecation)	S01 (95)
S2	Unimproved sanitation facilities	S01(14,15,24,41,51,96)
S3	Improved sanitation facilities	=All HH-S1-S2
*	*Note S4-S13 do not include unimproved facilities but do include shared improved facilities*	
S4	Improved sanitation facilities connected to septic tanks	S01 (12)
S5	Improved pit latrines or other improved sanitation facilities	S01 (13,21,22,23,31, 32)
S6	Toilets connected to sewers	S01 (11,18)
S7	Improved on-site sanitation facilities	=(S4+S5)/All HH
S8	Improved on-site sanitation facilities that are **contained**	=RS2 x S7
S9	Improved on-site sanitation facilities that are contained and **emptied**	=RS3 x S8
S10	Improved on-site sanitation facilities that are contained, not emptied and stored on-site **(treated and disposed of in-situ**)	=(1-RS3) x S8
S11	Improved on-site sanitation facilities that are contained and from which excreta are **emptied and buried in situ**	=RS4 x S9
S12	Improved on-site sanitation facilities from which excreta are **emptied and delivered to treatment** or designated disposal site)	=R5 x S9
S13	Improved on-site sanitation that are contained and from which faecal sludge delivered to treatment are treated **(excreta emptied and treated off-site)**	=RS6 x S12
S14	Improved sanitation facilities which are shared (**Limited sanitation services)**	=RS1 x S3
S15	Improved sanitation facilities which are not shared but are not safely managed **(Basic on-site sanitation services[2])**	=(1-RS1) x S7-S19
S16	Improved on-site sanitation facilities which are not shared, and from which excreta are treated and disposed in-situ (**Safely managed on-site sanitation)**	=(1-RS1) x S10
S17	Improved on-site sanitation which are not shared, and from which excreta are emptied and disposed in-situ (**Safely managed on-site sanitation)**	=(1-RS1) x S11
S18	Improved on-site sanitation which are not shared, and from which excreta are emptied and treated off-site (**Safely managed on-site sanitation)**	=(1-RS1) x S13
S19	**Safely managed on-site sanitation**	=S16+S17+S18
S20	Toilets connected via sewers to treatment plants	=R7 x S6
S21	Toilets connected via sewers to treatment plants where wastes are treated	=R8 x S30
S22	Sewer connections that are not shared but are not safely managed (**Basic off-site sanitation services**)	=(1-RS1) x S6 -S23
S23	Sewer connections that are not shared and wastewater are treated off-site **(Safely managed off-site sanitation)**	=(1-RS1) x S21
S24	**Basic[2] sanitation services** (total on and off-site)	=S15+S22
S25	**Safely managed sanitation services** (total on and off-site)	=S19+S23

Notes:

1. In the first phase SMOSS pilots, most countries did not use a data analysis software to analyse whether individual households achieved safely managed sanitation and instead used a spreadsheet to calculate aggregate proportions for each step in the service chain. This approach is adequate for national and global monitoring but has some limitations, particularly in the assumption that shared systems are evenly distributed across safe and unsafely managed practices. A data analysis software would enable assessment of multiple criteria for each respondent and therefore provide a more detailed assessment which may be useful for programming.

2. Since households with safely managed services also meet the criteria for basic services, the two levels can be grouped together as '**at least basic'** which is the indicator used for monitoring SDG target 1.4 (universal access to basic services). In the above Table At least basic = S24 + S25 (basic + safely managed).

A.2 Ratios

The ratios for analysis of core indicators in Table A 2 relate the different steps of the service chain and are used to calculate the global indicators, as shown in the right column of Table A 1 above. The calculations are based on the suggested core questions and response categories presented in the Data Collection Annexes, therefore will need to be adjusted if different questions or responses are used. The ratios RS1-RS5 relate to the proportion of improved sanitation facilities, with suggested data inputs from household questionnaires and sanitation inspections. Ratios RS6-RS8 relate to excreta and wastewater quantities and are informed from service authority or service provider data. The equations to calculate these ratios from the core questions are provided in Annex E: Analysis.

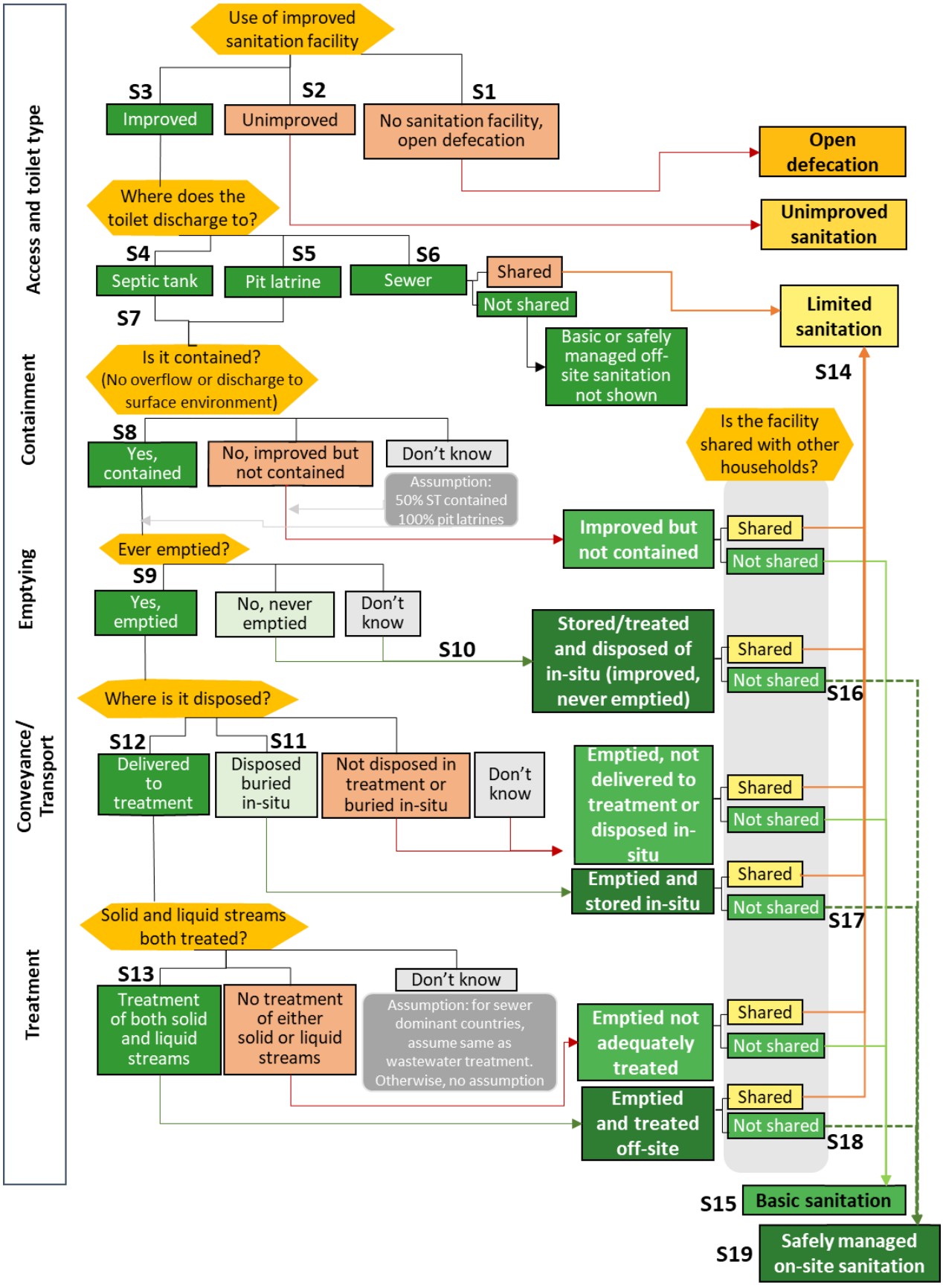
Table A 2. Ratios for analysis of core indicators

Ratio	Definition
RS1	% improved sanitation facilities that are shared
RS2	% improved on-site sanitation facilities that are contained
RS3	% improved on-site sanitation facilities that are emptied
RS4	% improved on-site sanitation facilities that are emptied and disposed of in-situ
RS5	% improved on-site sanitation facilities from which excreta are emptied and delivered to designated off-site treatment or disposal location
RS6	% excreta received from on-site sanitation facilities (faecal sludge) that is treated
RS7	% wastewater that is delivered to treatment plants
RS8	% wastewater delivered to treatment plants that receives treatment

A.3 Decision tree

The decision tree in Figure A 2 supports the systematic analysis of data to calculate national estimates of SMOSS for SDG indicator 6.2.1. The diagram shows how different response options to each core question either flow on to the subsequent step in the service chain assessment, or fall out either as safely managed sanitation or otherwise. This figure only details the steps for on-site sanitation and does not show safely managed off-site sanitation from sewers.

Figure A 2. Decision tree for analysis of core questions to inform SMOSS global indicators



A.4 Definitions of core indicators

Table A 3. Monitoring definitions for on-site sanitation (expanded from JMP 2018 Core questions - Table 3)

Definitions of improved sanitation facilities	Notes on classification
• **Flush/pour-flush toilet:** a flush toilet has a cistern or holding tank to store water for flushing and has a water seal (which is a U-shaped pipe below the seat or squatting pan) to prevent the passage of flies and odours. A pour-flush toilet also has a water seal but has no cistern and water is poured by hand for flushing. • **Flush to piped sewer system:** is a toilet that flushes excreta to a system of sewer pipes, also called sewerage, which is designed to collect human excreta (faeces and urine) and wastewater and remove them from the household environment. • **Flush to septic tank:** is a toilet that flushes excreta to a water-tight container, normally buried underground away from the dwelling, designed to separate liquids from solids which are then allowed to settle and decompose. • **Flush to pit (cesspool):** is a toilet that flushes excreta to a covered pit which retains solids. The base and sides of latrine pits may be permeable to allow liquids to percolate into the soil. This may also be referred to as cesspool or wet pit latrine. • **Flush/pour flush to don't know where:** indicates that the household uses an improved sanitation facility but does not know whether it flushes to a sewer, septic tank or pit latrine. • **Single pit latrine with slab:** is a dry sanitation system that collects excreta in a pit in the ground. The pit is covered by a squatting 'slab' or platform that is constructed from materials that are durable and easy to clean. The 'slab' has a small drop hole, or is fitted with a seat, allowing excreta to be deposited directly into the pit. • **Twin pit latrine with slab:** refers to a system where households use a second pit when the first one fills up and is designed to ensure that excreta are treated in situ for a sufficient amount of time before the wastes are evacuated safely. Twin pit latrines can be dry (double VIP, fossa alterna) or wet (offset pits connected to pour flush toilets). • **Ventilated improved pit (VIP) latrines with slab** (dry pits with ventilation pipes) are used in some parts of the world but neither ventilation nor superstructure design are part of the definition of an improved sanitation facility. Some latrines have tight-fitting lids to cover the drop hole when not in use, but such lids are not part of the definition of improved sanitation facilities. • **Composting toilet:** is a dry toilet into which carbon-rich material (vegetable wastes, straw, grass, sawdust, ash) is added to the excreta and special conditions maintained to produce inoffensive compost. A composting latrine may or may not have a urine separation device. • **Container based sanitation:** refers to a system where toilets collect excreta directly in sealable, removable containers (also called cartridges) which are regularly collected by commercial service providers and delivered to treatment. If there is no active and functioning program for collection and treatment, the container should be classified as a bucket.	1. **Improved sanitation facilities** are those designed to hygienically separate human excreta from human contact. These include wet sanitation technologies such as flush and pour flush toilets connected to sewers, septic tanks or pit latrines, and dry sanitation technologies such as dry pit latrines with slabs and composting toilets. 2. **Sewer systems** consist of facilities for collection, pumping, treating and disposing of human excreta and wastewater. The sewer category should only be used for systems designed to convey wastewater to treatment plants. Covered drains which are not designed to convey wastewater to treatment may be mistakenly referred to as sewers and clarification of local interpretation of "sewer" may be needed in some contexts. 3. **Septic tanks** are designed to contain and treat excreta in situ and should have at least two chambers separated by a baffle and a T-shaped outlet pipe to reduce the scum and solids that are discharged. The effluent should infiltrate into the subsurface through a soak pit or leach field, or discharge to a sewer system or further treatment. However many household respondents are not able to provide technical information on the design of and construction of storage tanks. 4. The principal difference between improved and unimproved pit latrines is the presence of a 'slab'. **Pit latrines with slabs** that completely cover the pit, with a small drop hole, and are constructed from materials that are durable and easy to clean (e.g. concrete, bricks, stone, fiberglass, ceramic, metal, wooden planks or durable plastic) should be counted as improved. Slabs made of durable materials that are covered with a smooth layer of mortar, clay or mud should also be counted as improved.
Definitions of unimproved sanitation facilities	**Notes on classification**
• **Flush/pour flush to covered drain or open drain:** refers to households using toilets that discharge into covered or uncovered drains do not effectively contain excreta thereby exposing the community to faecal pathogens. These differ from sewer as they are not designed to convey wastewater and not connected to treatment plants.	5. '**Flush/pour flush to elsewhere**' suggests that excreta are not being discharged into a sewer, septic tank or pit latrine) but into the local environment and should therefore be classed as unimproved.

• **Pit latrine without slab/open pit:** is a dry sanitation system that uses a pit in the ground for excreta collection and does not have a squatting slab, platform or seat. An open pit is a rudimentary hole in the ground where excreta is collected. • **Bucket:** refers to the use of a bucket or other container for the retention of faeces (and sometimes urine and anal cleaning material), which are periodically removed for treatment, disposal, or use as fertilizer. • **Hanging toilet/hanging latrine:** is a toilet built over the sea, a river, or other body of water, into which excreta drops directly. • **No facility/bush/field:** includes defecation in the bush or field or ditch; excreta deposited on the ground and covered with a layer of earth (cat method); excreta wrapped and thrown into garbage; and defecation into surface water (drainage channel, beach, river, stream or sea).	6. **Pit latrines (or other facilities) with slabs that only partially cover the pit**, or with slabs constructed from materials that are not durable and easy to cleanJ (e.g. sticks, logs or bamboo) **should be classified as 'pit latrine without slab'** and counted as 'unimproved', even if they are covered with a smooth layer of mortar, clay or mud. 7. The use of open '**buckets**', 'pans', 'trays' or other unsealed containers which are collected and emptied each day by informal service providers (including 'manual scavengers') presents significant health risks and is classed as an 'unimproved sanitation facility'.
Definition of contained	**Notes on classification**
"Contained on-site sanitation facilities" have containments that do not overflow or discharge excreta directly to the surface environment • **Containments:** on-site systems (permeable or impermeable containers for storing excreta) that are located close to the toilet or latrine. Examples of containments include wet or dry pit latrines, septic tanks, and holding tanks. • **Do not overflow excreta to surface environment:** containment has no outlet or has an outlet discharging to a subsurface infiltration system (e.g. leach pit or infiltration field) or is connected to a piped sewer or closed drain for further treatment. Outlets or overflow pipes that discharge effluent directly to the surface environment (e.g. surface, open drains, waterways) are considered not contained. • **No overflow or other discharge to the surface environment**. This applies to all on-site systems (flush and dry) and could be due to overflow or flushing out of excreta during flooding, leakage or overflow due to containments being full, other leakage of excreta due to damage to the containment or other events. • **Directly to surface environment:** refers to direct discharges to surface environments (ground, floor, open drains, waterways) which may expose the household to harmful pathogens . Does not include sub-surface infiltration. Not contained: • Containments that have either an outlet/overflow pipe that discharges excreta directly to the surface environment, or are broken/leaking/overflowing excreta to the surface environment may expose humans to harmful pathogens and are classified as not contained.	8. Containment only applies to on-site sanitation facilities, *permeable or impermeable container for storing excreta close to the toilet or latrine (i.e. pit latrines, cesspools, septic tanks, and holding tanks*) and not toilets connected to sewer, drains or the environment. 9. Containment applies to both solid contents (settled sludge consisting of excreta along with hygiene or other waste products) and the liquid contents (supernatant consisting of excreta, flushing and ablution water, and occasionally also greywater from kitchen, washing, bathing, etc.). 10. **Dry pit latrines** (and container based sanitation) receive relatively little liquid inputs and are less likely to have outlet pipes for liquid effluent but may release excreta due to overflow, flooding or damages/collapse. 11. Many containments discharge liquid to the soil/ground through infiltration from the impermeable walls or base of the containment. For the purposes of SDG monitoring these are considered as 'contained', as long as the effluent does not contaminate the surface environment. In some contexts, expanded indicators may be used to assess potential risk to groundwater.
Definition of emptied	**Notes on classification**
• **Emptied:** improved on-site sanitation facilities that have **ever** been emptied. • **Not emptied but covered and left undisturbed when full:** As all pit latrines and septic tanks could be emptied, the emptying question is typically asked to all respondents with improved containments. However dry pit latrines, particularly in rural areas where there is adequate space, may not necessarily be emptied when full and are instead covered and a new pit built. While this is equivalent to never emptied, this response category was added due to previous confusion for respondents that do not expect to ever empty their dry pit.	12. It is recognized that some containments are designed for regular emptying (e.g. septic tanks) however emptying frequency is not considered in the global indicator. Expanded indicators can be used to assess duration of operation (age) or time between emptying (emptying frequency) and compare these to the local design standards. 13. All service providers (e.g. public, private or informal) and methods of emptying (e.g. manual, shovel, mechanical) are assessed as emptied. 14. Some survey respondents, particularly tenants, may not know if their containment was emptied. "Do not know" response is assumed to be 'not emptied'.

Definition of in-situ treatment and disposal	Notes on classification
Treatment and disposal in situ is classified as: • **Contained, not emptied:** All improved on-site systems that are contained but have never been emptied (see emptying definition above) can be considered safely managed through treatment and disposed in-situ. • **Contained, emptied, buried in-situ:** All improved on-site systems that are contained, emptied and disposed of in-situ can be considered safely managed if not shared. This includes buried in a covered pit at or near the household.	15. In-situ is not limited to the household premises and can also include covered burial nearby to the household. There is no definition or limit on the proximity. 16. Covered pit/trench elsewhere: While similar to buried in-situ this is classified as delivered off-site. 17. Arborloos: the practice of planting a tree on-top of a covered pit fits into this category. 18. Potential risk to groundwater from in-situ disposal is not considered.
Definition of transported to treatment	
• **Transported to treatment**: Excreta and other materials (faecal sludge) removed from containments and delivered to an off-site treatment plant or designated disposal site. • **Buried in a covered pit/trench elsewhere** (not at or near household) is considered transported to treatment.	19. Transport does not consider the level or type of treatment, therefore faecal sludge discharged at the follow sites can be considered transported: treatment plants (all types), piped sewer networks connected to treatment, or designated sites for faecal sludge treatment and disposal (i.e. landfill, drying beds, constructed wetlands, trenches) 20. All methods of transport (manual cart, truck or tanker) are included. **21.** Transported and discharged to open drains, water body or open ground (including agriculture fields) are considered not transported to treatment. While on-site sanitation facilities provide some minimal treatment, faecal sludge is unlikely to be adequately treated for direct use in agriculture or disposal in the environment.
Definition of treated	**Notes on classification**
• Faecal sludge is considered treated if delivered to a treatment plant that is designed to treat both solid and liquid phases and is treated. • Types of treatment accepted for faecal sludge are summarised Figure A3. Solid-liquid fraction separation alone is not considered treated. Faecal sludge can be treated at a faecal sludge treatment plant, a wastewater treatment plant, or co-treated with solid waste/composting (provided both solids and liquids are treated).	22. For SDG 6.2 (safely managed sanitation) only the specified type and level of treatment is considered. Performance of the treatment plant and exposure risk of disposal and reuse are not considered for SDG 6.2. 23. For SDG 6.3 (safely treated wastewater) performance of treatment plants against national standards is considered. Exposure risk of disposal and reuse are not considered for SDG 6.3. 24. Transport response category “Buried and covered in a pit/trench elsewhere” can be considered off-site treatment as per safe burial and storage (e.g deep row entrenchment).

Figure A 3. Types of treatment for solid and liquid fractions

	Faecal sludge [a]	Wastewater and liquid fraction from faecal sludge
Treated: Advanced treatment (possible for reuse)	**Further drying/ pathogen reduction** • Extended storage • Thermophilic anaerobic digestion • Sludge incineration • Mechanical/thermal drying (e.g. Pelletiser) • Lime or ammonia stabilization • Co-composting, black soldier fly, vermi-composting **Liquid fraction >** As per wastewater treatment	**Advanced and Tertiary treatment [a]** • Advanced oxidation • Membrane filtration • Carbon absorption • Ion exchange • Chemical oxidation • Advanced N, P removal • Disinfection **< Sludge/solid fraction** As per faecal sludge treatment
Treated: Adequate treatment	**Dewatering and/or stabilization of solid fraction** <u>Combined solid/liquid phase or septage</u> • Anaerobic pond, reactors or digestion • Mechanical dewatering (screw press, belt press) • Safe burial/storage (deep row entrenchment) <u>Solid fraction only</u> • Drying beds (planted or unplanted) **Liquid fraction >** • As per wastewater treatment	**Secondary treatment [b]** • Aerobic suspended or attached growth (e.g. AS or trickling filters) • Anaerobic suspended or attached growth (e.g. UASB) • Waste stabilisation ponds • Wetlands **< Sludge/solid fraction** • As per faecal sludge treatment
	The levels above are the threshold for 6.2 and 6.3	
Not adequately treated	**Solid liquid separation only** • Sedimentation (settling-thickening tanks or pond) Storage / partial treatment (septic tanks)	**Primary treatment [c]** Screening and grit removal with • Sedimentation • Chemical precipitation • Filtration • High rate clarification Flotation
Not treated		

Notes:

a. Table adapted from the WHO and UN-Habitat 2018 description of treatment types to also include the faecal sludge treatment technologies referenced in Tayler 2018 and Strande et al 2014.[1]

b. **Tertiary treatment** is a process that follows secondary treatment and removes nitrogen, phosphorous or any other pollutant, such as microbiological pollution or colour, that affects the quality or a specific use of water.

c. **Secondary treatment** is a process that follows primary treatment of water and generally involves biological or other treatment with a secondary settlement or other process that results in a BOD removal of at least 70 per cent and a chemical oxygen demand (COD) removal of at least 75 per cent.

d. **Primary treatment** can be described as a mechanical, physical or chemical process involving settlement of suspended solids or any other process in which the biochemical oxygen demand (BOD) of the incoming water is reduced by at least 20 per cent before discharge, and the total suspended solids of the incoming water are reduced by at least 50 per cent. Where effluent from primary treatment plants is discharged to water bodies at very low risk of exposure to humans (for example, long ocean outfalls) these wastes are also classified as safely managed.[2]

[1] WHO and UN-Habitat, 2018. Piloting the monitoring methodology and initial findings for SDG indicator 6.3.1. Geneva: World Health Organization and UNHABITAT.
Tayler, K., 2018. Faecal Sludge and Septage Treatment: A guide for low-and middle-income countries. Warwickshire: Practical Action publishing.
Strande,L. & Brdjanovic, D. (Eds.), 2014. Faecal sludge management: Systems approach for implementation and operation. IWA publishing.

[2] WHO and UNICEF, 2017. Progress on Drinking Water, Sanitation and Hygiene Update and SDG Baselines 2017. Geneva: World Health Organization and UNICEF

A.5 Data sources to inform global indicators

The previous tables of indicators and ratios suggest the source of data to estimate each indicator.

Table A 4 summarizes the suggested data sources to inform each indicator across the service chain, including what are considered more reliable and primary sources and what other sources could be used.

Table A 4. Potential data sources to inform global indicators for monitoring SMOSS

Service chain Data collection method	Facility type	Containment	Emptying	Transport	Treatment
Household questionnaire	S1-S6, S14	(S8)	S9, S10	In-situ only S11 (S12)	
Household sanitation inspection	S1-S6	S8			
Data from local government (e.g. Administrative data)			(S9, S10)	S11, S12	S13
Data from service providers (e.g. via regulators)			(S9, S10)	S11, S12	S13
Service chain spot checks / inspections				S11, S12	S13

Levels of reliability and use of source Low High

() secondary data source

The subsequent annexes provide examples of the core questions for each data collection method to estimate the global indicators. Table A 5 indicates how these core questions could be implemented into existing or new data collection methods. The **household questionnaire** questions are the most developed and tested, having previously been included in national surveys and international survey programmes (e.g. MICS and DHS), and tested in the Phase 1 pilots. The **household sanitation inspection** questions were identified from phase 1 pilots as well as WHO sanitation inspection forms[3]. WHO also drafted **local government and service provider questions** and **service inspection questions** several year ago which have been adapted in Annex D to align with SDG monitoring needs. These have been less widely tested and may be refined following testing in phase 2 SMOSS monitoring pilots.

Table A 5. Summary of core questions

Data method	Implementation	Proposed core questions
Household questionnaire	Minimum questions to[1] - Integrate into existing multi-topic household surveys, or - Part of a dedicated sanitation survey	H1-H8 covering access and sanitation type, containment, emptying and disposal
Household sanitation inspection	Minimum questions to - include in existing multi-topic household surveys or inspections. - Part of a dedicated household sanitation inspection (e.g. periodic inspections by public/environmental health officers)	IH1-IH5
Service authority and service surveys	Minimum questions to - Include in existing administrative or regulatory data collection methods - Conduct a dedicated survey of service authorities or service providers	- Service authority: SA10-SA41 (5 background questions and 5 questions on Indicator) - Service provider emptying and transport: SPE10-14

[3] WHO sanitation inspection forms for seven types of sanitation systems, available at https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/sanitation-safety/sanitation-inspection-packages

Data method	Implementation	Proposed core questions
		- Service provider treatment: SPT10-15
Inspection / spot checks	Field observations and interviews with service provider or operator of emptying/transport/treatment to verify administrative or survey data	For global indicators core questions are proposed for treatment plant spot checks SI 10-15

Note 1: There are two main ways in which the questions could be used. In most cases we expect that they will be integrated into an existing multi-topic household questionnaire. Alternatively, a dedicated sanitation survey may be conducted. Similarly household sanitation inspections could either be integrated as an observation component of an existing multi-topic household questionnaire or existing household inspection, such as by public health or environmental officers. Or these inspection questions could be part of a dedicated sanitation inspection. Details of the implementation approaches for each method are included in the main guidance document.

A.6 Sampling considerations

The annexes also outline the **key sampling considerations** for each data collection method and are more relevant for the dependent surveys as integrated questions will need to align with the sampling strategy of the existing monitoring systems. A summary of key considerations detailed further in the annexes:

- **Household questionnaire:** Dedicated surveys may aim to be nationally representative or choose to focus on sub-sets of the population. Sampling methods applied in the phase 1 pilots are provided in Annex 2.4. Existing national guidance on sampling should be consulted.
- **Household sanitation inspection:** The sampling approach of dedicated surveys depends on whether data are to be used as a primary source (larger sample needed) or to validate household questionnaire responses or analysis assumptions. Existing approaches have included setting a target number of inspections per year, a timeframe in which all containments should be assessed, or if integrated with household questionnaires, a percentage of hosueholds to also conduct the inspection.
- **Service authority:** Distribution of surveys may depend on the institutional arrangements but would typically aim to include all administrative areas. Acceptable response rates should be benchmarked against existing national guidance or typical response rates for other surveys, provided they are reasonable. Eurostat advises on focusing on the most populated areas as these will have a greater impact on the national estimate than small towns.[4]
- **Service provider:** Sampling requires first understanding the sampling frame – the possible respondent types and number of each. This may be easier if services are regulated with existing records of providers but these lists may be exclude non-regulated or informal providers that are common in some countries. Different sampling methods and response rates may be needed for different service provider types. UN-Habitat's sampling of cities approach may be useful for treatment plant sampling.[5]

[4] EUROSTAT, 2021. Data Collection Manual for the OECD/Eurostat Joint Questionnaire on Inland Waters and Eurostat Regional Water Questionnaire. Luxembourg: Eurostat. Available at: https://ec.europa.eu/eurostat/documents/1798247/6664269/Data+Collection+Manual+for+the+OECD_Eurostat+Joint+Questionnaire+on+Inland+Waters+%28version+3.0%2C+2014%29.pdf/f5f60d49-e88c-4e3c-bc23-c1ec26a01b2a

[5] UN-Habitat, 2016. National Sample of Cities: A model approach to monitoring and reporting performance of cities at national level. Nairobi: UN-Habitat. Available at: https://unhabitat.org/sites/default/files/2020/06/national_sample_of_cities_english.pdf