

A comparison of methods for
excreta flow analysis:
WHO/UNICEF JMP and SFD PI

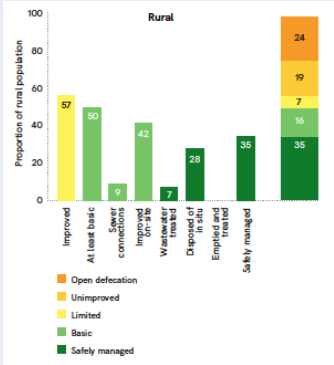
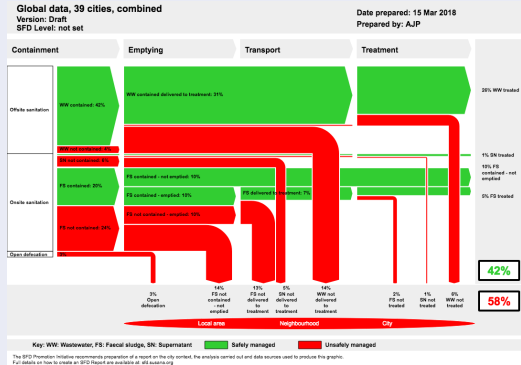
Andy Peal

May 2018

Draft vn 1

A comparison of methods WHO/UNICEF JMP and SFD PI

- Overview
- Definitions – highlighting differences and examples
 - Data sources and managing data gaps
 - Outputs produced

	WHO/UNICEF JMP	SFD PI
Focus	National level, compiled from urban and rural area datasets	City or urban area
Purpose	Estimating the proportion of population using <i>safely managed sanitation</i> as defined by SDG indicator SDG 6.2.1, which indicates progress being made towards meeting SDG target 6.2.	Estimating proportion of population using <i>safely managed sanitation</i> as defined by SFD Promotion Initiative (SFD PI).
Methodology	Described in JMP methodology, 2017 update (available at: www.washdata.org)	Described in SFD PI manual (available at: www.susana.org)
Outputs	Charts based on <i>updated JMP sanitation ladder</i> 	Graphical representation known as an <i>SFD Graphic</i> 

Definitions

WHO/UNICEF JMP	SFD PI
<p><i>Standard classifications</i> for sanitation facilities (toilets) and <i>service level classifications</i> (for how the flows from the toilets are managed along the sanitation chain)</p>	<p>Definitions for each step of the sanitation chain: <i>Containment, Emptying, Transport, Treatment</i>, and for both <i>offsite sanitation</i> and <i>onsite sanitation</i>, which are also defined.</p>
<p><i>Standard classifications</i> determine if a sanitation facility is improved or unimproved. If improved, then <i>service level classifications</i> determine if <i>safely managed</i> or not, provided it is <i>Not shared with other households</i>. And then for on-site sanitation extent of: <i>Containment, Emptying, Treatment and (or) Disposal of excreta</i> And for off-site sanitation extent of: <i>Wastewater transported to treatment,</i> <i>Wastewater treated</i></p>	<p><i>Offsite sanitation: A sanitation system in which excreta (referred to as wastewater) is collected and transported away from the plot where they are generated. An offsite sanitation system relies on a sewer technology for transport.</i></p> <p><i>Onsite sanitation: A sanitation technology or sanitation system in which excreta (referred to as faecal sludge) is collected and stored and emptied from or treated on the plot where they are generated.</i></p>

Toilet and containment

WHO/UNICEF JMP

Twenty standard classifications define whether sanitation technology [toilet and what it is connected to] is *improved* or *unimproved*.

SFD PI

Sixty one containment systems [a toilet and what it is connected to] are defined as either *contained* or *not contained*.

Table 4: Classification of sanitation technologies

First level classification	Second level classification	Improved	Unimproved
Flush toilets	to piped sewer system	X	
	to septic tank	X	
	to pit	X	
	to unknown place/not sure/DK	X	
	to open drain		X
	to elsewhere		X
Pour flush latrines	to piped sewer system	X	
	to septic tank	X	
	to pit	X	
	to unknown place/not sure/DK	X	
	to elsewhere		X
Dry latrines	Ventilated Improved Pit latrine	X	
	Composting toilets	X	
	Pit latrine with slab	X	
	Pit latrine without slab/open pit		X
	Hanging toilet/hanging latrine		X
	Bucket latrine		X
	No facility	Bush, field	
Other	Other improved	X	
	Other unimproved		X
DK/Missing			X

Containment: Where does the toilet discharge to?	What is the containment connected to?																	
	to centralised combined sewer	to centralised foul/separate sewer	to decentralised combined sewer	to decentralised foul/separate sewer	to soak pit	to open drain or storm sewer	to water body	to open ground	to don't know where	no outlet or overflow								
No onsite containment. Toilet discharges directly to sewer, or open drain etc.	C	C	C	C	C/NC	NC	NC	NC	NC	Not applicable								
Septic tank	C	C	C	C	C/NC	NC	NC	NC	NC									
Fully lined tank (sealed)	C	C	C	C	C/NC	NC	NC	NC	NC	C								
Lined tank with impermeable walls and open bottom	C/NC	C/NC	C/NC	C/NC	C/NC	NC	NC	NC	NC	C/NC								
Lined pit with semi-permeable walls and open bottom	Not applicable									C/NC								
Unlined pit										C/NC								
Pit (all types), never emptied but abandoned when full and covered with soil										C/NC								
Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil	Not applicable									NC								
Toilet failed, damaged, collapsed or flooded										NC	NC	NC	NC	NC	NC	NC	NC	NC
Containment (septic tank or tank or pit latrine) failed, damaged, collapsed or flooded										NC	NC	NC	NC	NC	NC	NC	NC	NC
No toilet. Open defecation	Not applicable						NC	NC	NC	Not applicable								

KEY:

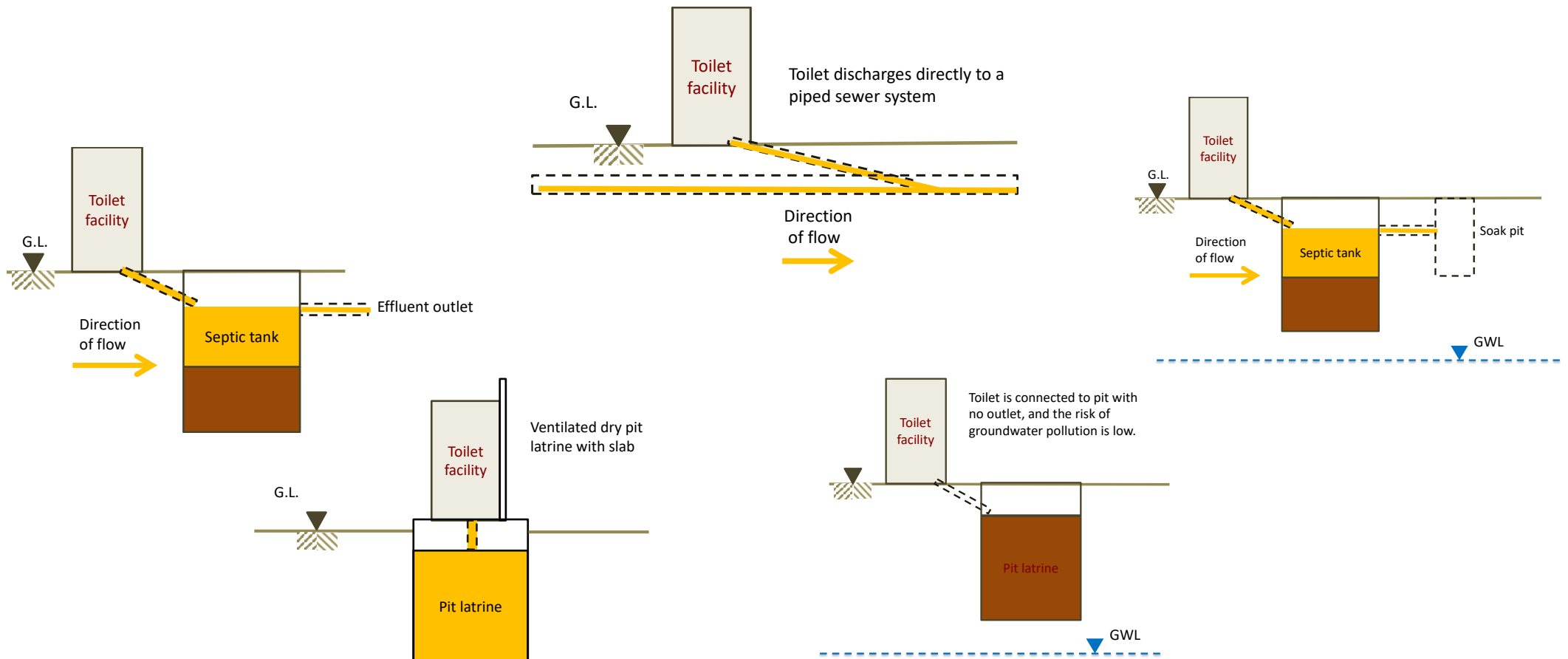
C	Excreta are contained	NC	Excreta are NOT contained
C/NC	Extent to which excreta are contained is dependent on level of risk of groundwater pollution	Not applicable	Combination of technologies is not possible

Important differences at containment step

WHO/UNICEF JMP	SFD PI
Shared sanitation	
<p>Disaggregates population using shared facilities. Population using <i>improved</i> facilities which are shared, are termed <i>limited</i> and do not contribute to proportion <i>safely managed</i>.</p>	<p>Does not disaggregate population using shared facilities. Population using shared facilities are considered alongside others (so may be either 'contained' or 'not contained') and can contribute to proportion 'safely managed'.</p>
Discharges and/or leakage from sewers, tanks or pits to the environment	
<p>No specific definition for leakages or discharges, but where data exist on<i>improved sanitation systems ...that leak faeces into the environment.... data is adjusted accordingly.</i></p>	<p>Toilets and containment technologies (e.g. tanks and pits) that are connected to open drains, open ground or water bodies are considered as <i>not contained</i>. However, supernatant flows from tanks to open drains is included in SFD PI method. Therefore, proportion using tanks to open drains can contribute to proportion <i>safely managed</i> if supernatant is delivered to treatment and treated.</p>
Groundwater pollution	
<p>Methodology does not consider whether or not toilet facility may be polluting groundwater used for drinking.</p>	<p>Containment systems in locations where there is a significant risk of polluting groundwater used for drinking are considered <i>not contained</i>, but can contribute to proportion safely managed.</p>

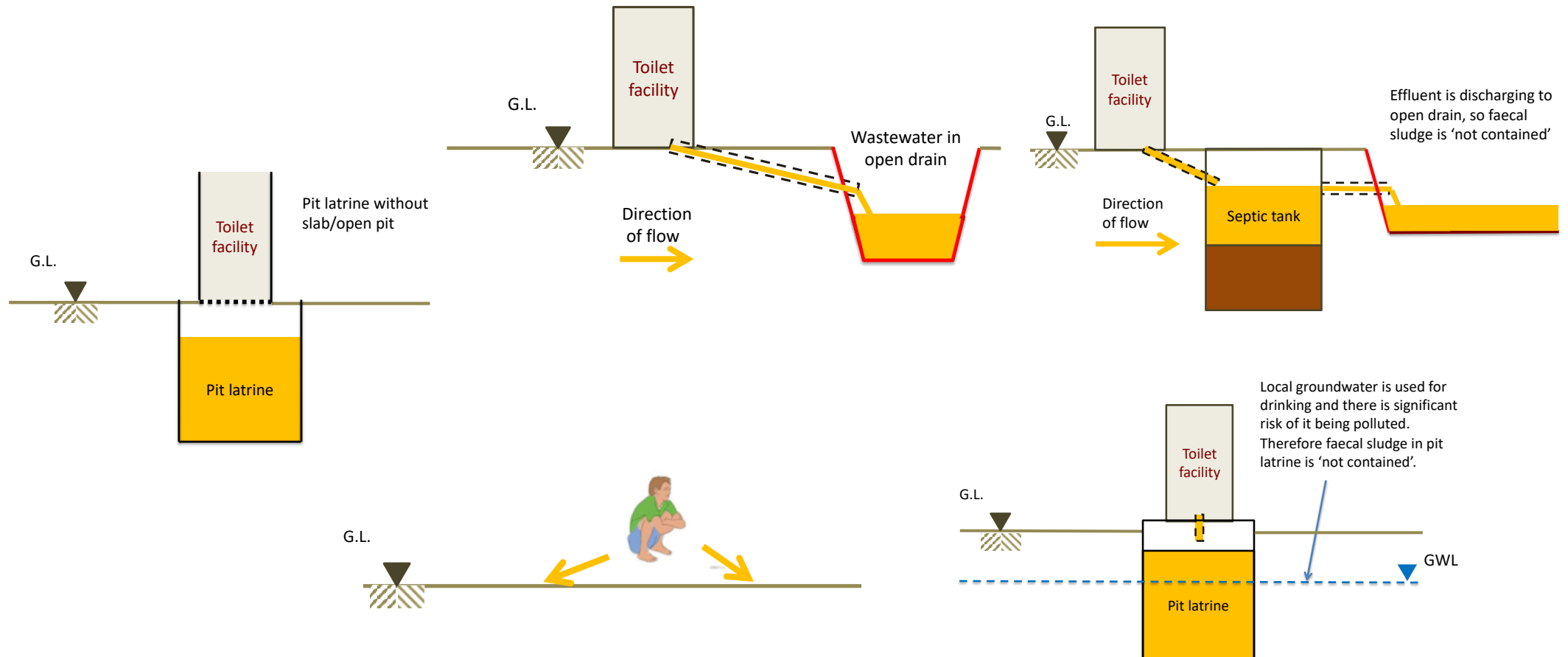
Examples

WHO/UNICEF JMP	SFD PI
Improved	Contained



Examples

WHO/UNICEF JMP	SFD PI
Unimproved	Not contained



Onsite sanitation - Emptying

WHO/UNICEF JMP	SFD PI
<p>Service level classification given as: <i>The JMP seeks data on the proportion of people using onsite sanitation storage facilities (septic tanks or latrines) which have ever been emptied. Information on the time since most recent emptying, the way excreta were emptied, or the use of protective equipment to prevent occupational exposures during emptying may be collected but have not been used in calculating estimates.</i></p> <p>Any emptying event is considered – regardless of method or time since done. But only improved facilities which are not shared – a basic service level - are included in the classification. (NB. Referring to slide 5 table 4, <i>septic tanks</i> are defined as improved, but <i>latrines</i>, as stated in classification, is ambiguous).</p>	<p>Defined as: <i>The manual or motorized removal of faecal sludge from onsite sanitation systems.</i></p> <p>Emptying of both <i>contained</i> and <i>not contained</i> systems are included in the definition.</p> <p>Systems that are <i>not contained</i> and <i>emptied</i> can contribute to proportion safely managed. But systems that are <i>not contained</i> and <i>NOT emptied</i> ALL contribute to proportion <i>unsafely managed</i>.</p>

Onsite sanitation - Transport

WHO/UNICEF JMP	SFD PI
<p>No specific service level classification.</p> <p>However, text in <i>Treatment and disposal of excreta from on-site storage facilities</i> states<i>excreta emptied from on-site storage facilities (septic tanks or latrine pits) transported, usually by cart, truck, or tanker and delivered to treatment plants (regardless of the type of treatment plant) or discharged into sewer networks.</i></p> <p>Only excreta, which are emptied and transported (by any method) and either delivered to treatment plants or discharged to sewers are included.</p> <p>As above, and not stated clearly in text, but this is only from improved facilities. (NB. <i>Septic tanks</i> are defined as improved, but <i>latrine pits</i> is ambiguous).</p>	<p>For onsite sanitation, defined as: <i>The manual or motorized conveyance of faecal sludge emptied from onsite sanitation systems or technologies.</i></p> <p>Transport from both <i>contained</i> and <i>not contained</i> systems or technologies that have been <i>emptied</i> are included in the definition.</p> <p>For offsite sanitation, defined as: <i>For offsite sanitation this refers to the conveyance of wastewater using a sewer network.</i></p> <p>And the notes clarify that in some cases open drains are included within the definition, but that this is usually considered an illegal practice. Where this approach is used and open drains deliver wastewater to treatment, the <i>WW not contained</i> is included in the proportion <i>safely managed</i>.</p>

Onsite sanitation - Treatment

WHO/UNICEF JMP

Service classification states:

Excreta from on-site sanitation facilities may be transported to wastewater treatment plants or to specially designed faecal sludge treatment plants. Excreta delivered to wastewater treatment plants providing at least secondary treatment are classed as safely managed. Excreta delivered to faecal sludge treatment plants are classified as safely managed if both the liquid fractions and solid fractions are treated.

Only excreta from improved systems are included. Performance of plant and end-use/disposal are not considered.

Installed treatment type is benchmark for safe/unsafe, with *at least secondary treatment* being classed as *safely managed*.

SFD PI

Defined as: *Process/es that changes the physical, chemical and biological characteristic or composition of faecal sludge or wastewater so that it is converted into a product that is safe for end-use.*

The treatment type, efficiency or effectiveness is not specified. Instead, the proportion/level/extent of treatment is considered contextual and local stakeholders are encouraged to agree on what is appropriate given the local situation (i.e. influent characteristics, treatment type and performance, and end-use/disposal arrangements).

Offsite sanitation - Transport

WHO/UNICEF JMP	SFD PI
<p>Service level classification defined as: <i>This refers to the proportion of excreta flushed into sewer systems which are transported along with wastewater and delivered to treatment plants (regardless of the type of treatment plant). Wastewater may not be transported to treatment due to exfiltration, pump failure, breaks or blockages in the sewer network system, or may discharge directly to open drains, water bodies or open ground.</i></p>	<p>Definition is: <i>the conveyance of wastewater using a sewer network.</i></p> <p>Wastewater transported in open drains is usually considered an illegal practice and defined as <i>not contained</i>, therefore contributing to the proportion <i>unsafely managed</i>. However, the notes clarify that in cases where open drains deliver wastewater to treatment where it is 'treated', the 'not contained' wastewater is included in the proportion 'safely managed'.</p>

Offsite sanitation - Treatment

WHO/UNICEF JMP	SFD PI
<p>Service classification states: <i>This refers to the proportion of wastewater reaching wastewater treatment plants which receives at least secondary (biological) treatment. Wastewater which receives primary treatment is not considered safely managed, unless the effluent is discharged in a way that precludes further human contact (e.g. through a long ocean outfall).</i></p> <p>Performance of plant and end-use/disposal arrangements are not considered.</p> <p>Installed treatment type is benchmark for safe/unsafe, with <i>at least secondary treatment</i> being classed as <i>safely managed</i>.</p>	<p>Definition is same for onsite and offsite sanitation - see above.</p>

Data gaps

WHO/UNICEF JMP	SFD PI
<p>Offsite sanitation</p> <p>Containment and transport: <i>...in the absence of any data, the JMP assumes that containment and transport for excreta in sewerred systems are each 100%.</i></p> <p><i>Treatment:</i> <i>Where the only available data are ambiguous (e.g. “treated”) the JMP assumes at least secondary but seeks clarification during country consultations.</i></p> <p>Where there are data gaps in treatment, JMP applies an assumption based on the the improved sanitation type used by the majority of the population – see next slide.</p>	<p>Where data is not available but it is known that flows from a sanitation technology or system diverge (e.g. septic tanks are emptied but not all faecal sludge reaches treatment) the SFD PI recommends that a 50:50 split is assumed.</p> <p>This approach is used for flows from both offsite and onsite sanitation, and attempts to minimise the maximum error.</p>

Data gaps: JMP decision tree for estimation of safely managed sanitation services

(from JMP, 2018)

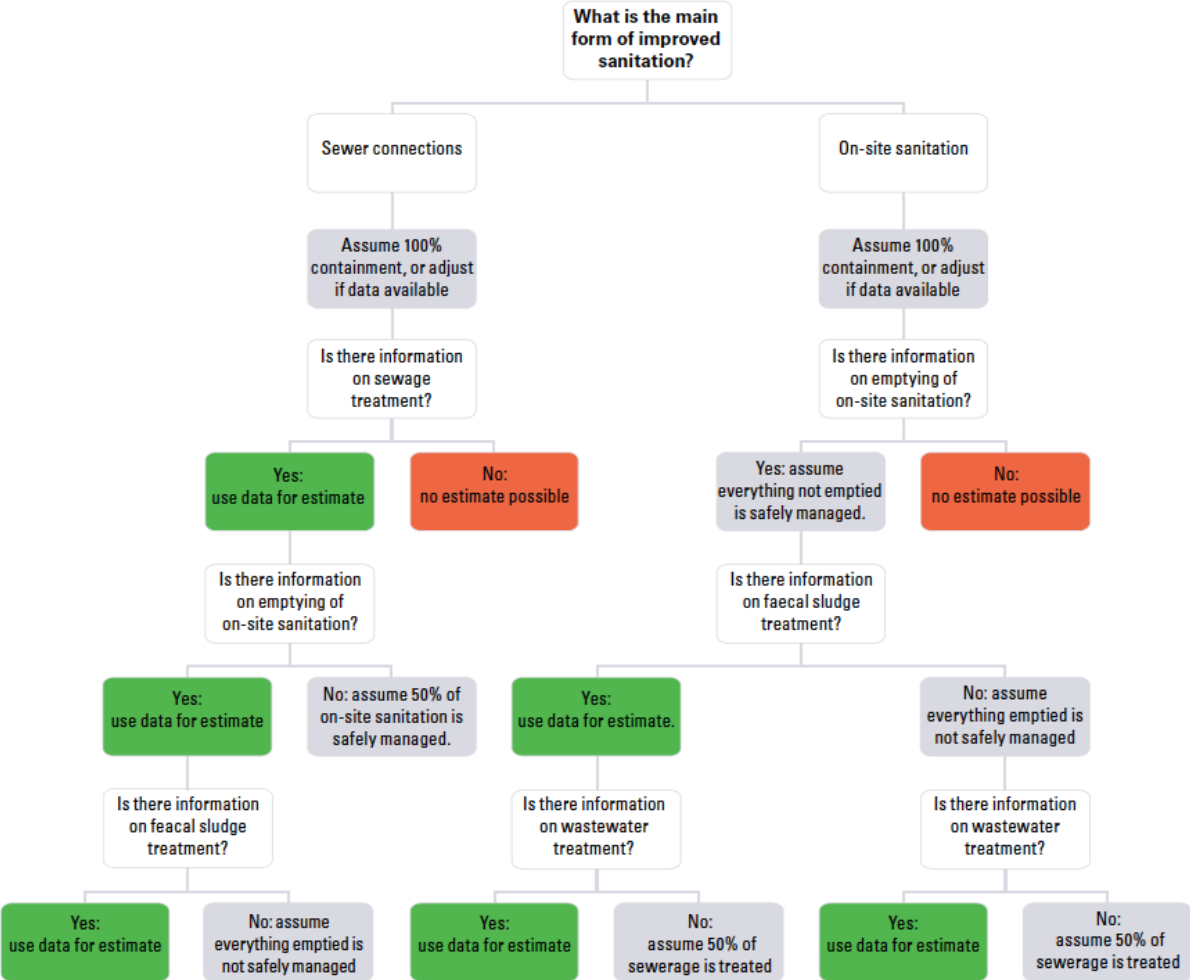


Figure 8: Decision tree for estimation of safely managed sanitation services

	WHO/UNICEF JMP	SFD PI
Data gaps continued	<p>Onsite sanitation <i>....onsite sanitation systems (including septic tanks and improved latrines) are assumed to fully contain the excreta flushed into them, unless there is evidence to the contrary.</i></p> <p>i.e. assumes that containment in septic tanks and improved latrines is 100% <i>unless there is evidence to the contrary</i></p> <p>Where there are data gaps in emptying and treatment, JMP applies an assumption based on the the sanitation type used by the majority of the population – see previous slide.</p>	

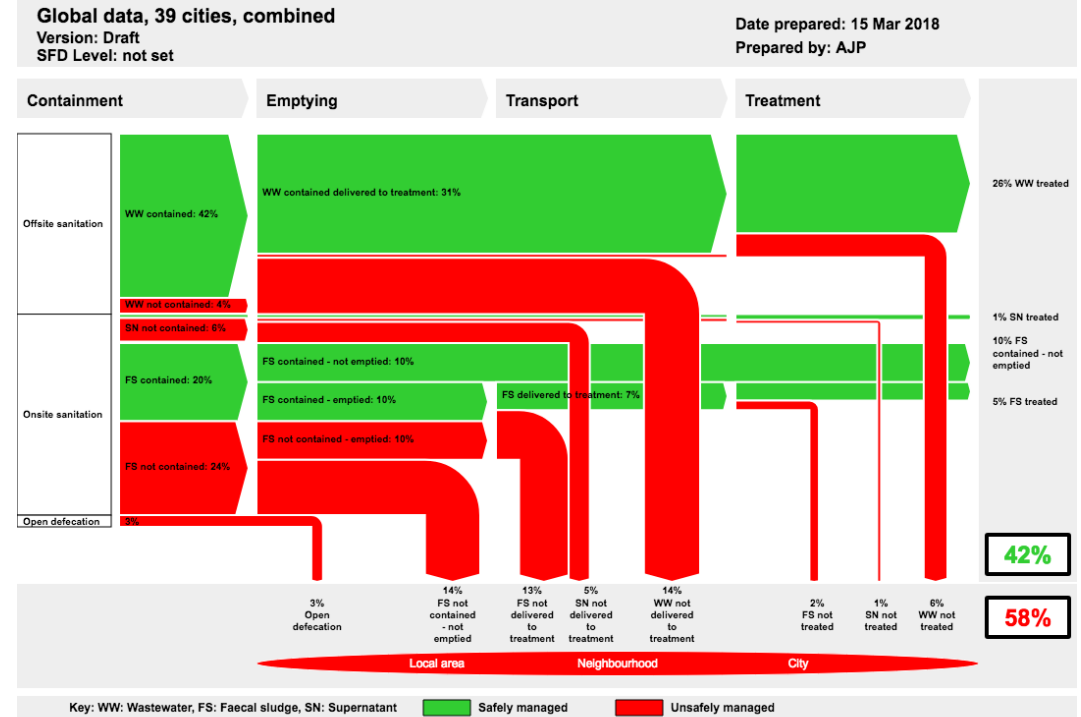
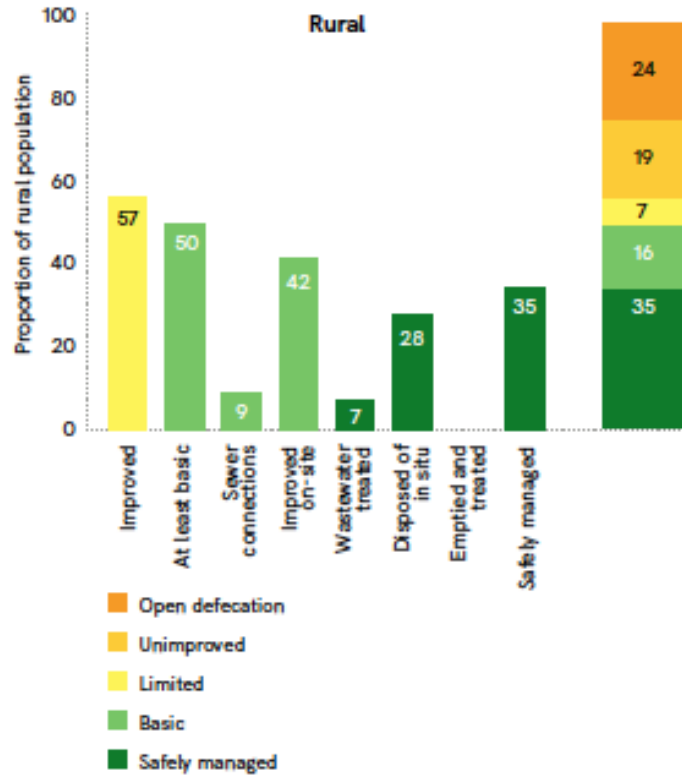
Outputs

WHO/UNICEF JMP

Charts based on the updated sanitation ladder.

SFD PI

A graphical representation known as an SFD Graphic.



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