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A Statistical Note: Proposal for Indicator Monitoring Framework for WaSH, and Wastewater Targets under the SDGs

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A.1 Purpose

The objective of this document is to facilitate discussions on indicators and monitoring frameworks for post2015 monitoring both at the Expert Group Meeting, as well as at the 46th Statistical Commission, for Goal 6: Ensure availability and sustainable management of water and sanitation for all, covering only the WASH and wastewater components of the goal.

A.2 Background

As the world prepares forPost-2015 Development Agenda, the Open Working Group (OWG) on Sustainable Development Goals (SDGs) proposed in their report to the UN General Assembly[1] in July 2014 a framework of 17 SDGs covering the wide range of drivers across the three pillars of sustainable development. The OWG proposal includes a dedicated goal on water and sanitation, with six technical targets. This note covers targets concerning drinking-water, sanitation, hygiene and wastewater parts of the goal.

Targets 6.1 and 6.2 represent a continuation and improvement of the Millennium Development Goals (MDGs) discourse with a clear focus on finishing the unfinished MDG agenda on sanitation, hygiene and drinking-water. The current and future monitoring mechanism for these two targets is the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP, www.wssinfo.org).

Target 6.3 expands the framework to cover full sanitation chain to underscore the importance of sanitation beyond the use of sanitation facilities to cover wastewater treatment, the lack of which is a dominant source of water pollution and deterioration of water quality.

While monitoring of the drinking water and sanitation has been done by the JMP for the past 25 years, the expanded monitoring of the sanitation and wastewater builds on the JMP data and experiences as well as those by other UN agencies, like FAO UNESCO or UN Habitat on wastewater issues. To respond to the emerging needs to routinely monitor the additional global targets several UN agencies with the support of the Swiss Agency for Development and Cooperation are currently developing the Global Expanded Water Monitoring Initiative (GEMI)[2] which complements the efforts by the JMP.

The first and foremost purpose of global monitoring is to provide evidence for policy making and must therefore be action-oriented, measuring progress objectively for the global community and providing guidance on global investments. This requires “timely and reliable data” gathered in a cost-effective manner. For example, the JMP relies on surveys conducted by National Statistical Offices, therefore data gathered outside of the water sector but serves multiple sectors, address the needs of development community, and are known for their quality and reliability. In the expanded monitoring framework for the SDGs, we are considering other novel data sources, like data from earth observations, for cost effective monitoring. This note therefore also highlights two examples on how traditional data sources can be integrated with geospatial data from Earth observations.

[1] 68th General Assembly document: A/68/970, available at http://undocs.org/A/68/970
[2] http://www.unwater.org/publications/publications-detail/en/c/243070/

B.1 Proposed Indicators and monitoring framework for WASH in the SDGs

The JMP, established in 1990, is the global authority for WASH sector monitoring and has a strong track record in working closely with Inter Agency Expert Groups, UN Statistical Division and national statistical authorities to develop and apply common standards for data collection and analysis. The long four year preparation on post-2015 WASH monitoring, helped JMP lay the foundation for reporting on the progressive elimination of inequalities in access to different levels of drinking-water, sanitation and hygiene services. Service level indicators correspond with human rights criteria of quality, availability, accessibility, acceptability and affordability and build directly on existing MDG indicators.

This paper identifies the proposed indicator which could be used for monitoring the proposed SDG targets in all countries, as well as allow for reporting on lower levels of service showing which level a particular country stand in terms of its development ladder as well at what level they are able to report and monitoring vis-à-vis the access to their population to different types of water and sanitation services. Drinking water and sanitation 'ladders' are therefore used to illustrate progressive improvement in both service levels and in monitoring.

Target 6.1 – By 2030, achieve universal and equitable access to safe and affordable drinking water for all

Target language	Normative definitions of target elements
6.1 – By 2030, achieve	
universal	Implies all exposures and settings including households, schools, health facilities, workplaces, etc
and ***equitable***	Implies progressive reduction and elimination of inequalities between population sub-groups
Access	Implies sufficient water to meet domestic needs is reliably available close to home
to ***safe***	Safe drinking water is free from pathogens and elevated levels of toxic chemicals at all times
and ***affordable***	Payment for services does not present a barrier to access or prevent people meeting other basic human needs
drinking water	Water used for drinking, cooking, food preparation and personal hygiene
for all	Suitable for use by men, women, girls and boys of all ages including people living with disabilities

Target 6.2 – By 2030, achieve adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

Target language	Normative definition of target elements
6.2 – By 2030, achieve	
access (for all)	Implies facilities close to home that can be easily reached and used when needed
to ***adequate***	Implies a system which hygienically separates excreta from human contact as well as safe reuse/treatment of excreta in situ, or transport to a treatment plant
and ***equitable***	Implies progressive reduction and elimination of inequalities between population sub-groups
sanitation	Sanitation is the provision of facilities and services for safe management and disposal of human urine and faeces
and ***hygiene***	Hygiene is the conditions and practices that help maintain health and prevent spread of disease including hand washing, menstrual hygiene management and food hygiene
for all	Suitable for use by men, women, girls and boys of all ages including people living with disabilities
end ***open defecation***	Excreta of adults or children are: deposited (directly or after being covered by a layer of earth) in the bush, a field, a beach, or other open area; discharged directly into a drainage channel, river, sea, or other water body; or are wrapped in temporary material and discarded
paying special attention to the ***needs of women and girls***	Implies reducing the burden of water collection and enabling women and girls to manage sanitation and hygiene needs with dignity. Special attention should be given to the needs of women and girls in 'high use' settings such as schools and workplaces, and 'high risk' settings such as health care facilities and detention centres.
and ***those in vulnerable situations***	Implies attention to specific WASH needs found in 'special cases' including refugee camps, detention centres, mass gatherings and pilgrimages

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B.2.1 Proposed indicators for monitoring drinking-water services[3]

Drinking water service ladder	Indicator	Definition	Data sources and measurability	Disaggregation	Timeline
Household services					
Safely managed water	Percentage of population using safely managed drinking water services	Population using a basic[1] drinking water source which is located on premises and available when needed; free of faecal (and priority chemical) contamination and/or regulated by a competent authority	Household surveys can provide data on basic water on premises as well as availability when needed and free from contamination via direct water quality testing. Administrative sources can provide data on regulation of water safety and risk management	Urban/rural Wealth Affordability Others TBC	Elements from hh surveys can be reported immediately. Safety/regulation will initially be estimated globally and regionally, and progressively at country level.
Basic water	Percentage of population using basic drinking-water services	Percentage of population using a basic drinking water source[4] with a total collection time of no more than 30 minutes for a roundtrip including queuing	Household surveys	As above	Immediate
Unimproved water	Percentage of population using inadequate sources of drinking water	Percentage of population using unimproved drinking water[5] sources or basic drinking water sources with a total collection time of more than 30mins	Household surveys	As above	Immediate
Surface water	Percentage of population using water directly from surface water sources	Percentage of population using surface water sources[6]	Household surveys	As above	Immediate
Extra-household services					
Basic water in schools	% of pupils enrolled in schools with basic water services	Percentage of pupils enrolled in primary and secondary schools with a functional basic drinking water source on or near premises and water points accessible to all users during school hours	Institution surveys, admin data, EMIS	Urban/rural Gender	Medium term (monitoring package needs to be standardised; basic facilities depend on the type of facility; monitoring systems require national and international support)
Basic water in Health Care Facilities	% of beneficiaries using health care facilities with basic water services	Percentage of beneficiaries using health facilities with a functional basic water source on premises and water points accessible to all users at all times	Institution surveys, admin data, HMIS	Urban/rural	

[3] The top row is the proposed SDG indicator, the rest are part of the global reporting 'ladder' used by JMP.
[4] Basic drinking water sources [MDG 'improved' indicator] include the following types: piped water into dwelling, yard or plot; public taps or standpipes; boreholes or tubewells; protected dug wells; protected springs and rainwater. Packaged drinking water is considered as a basic source if households use a basic water source for other domestic purposes
[5] Unimproved drinking water sources [MDG 'unimproved' indicator] include the following types: unprotected dug well, unprotected spring, cart with small tank/drum, bottled water
[6] Surface water includes rivers, dams, lakes, ponds, streams, canals, and irrigation channels

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B.2.2 Proposed indicator for monitoring sanitation services[7]

Sanitation service ladder	Indicator	Definition	Data sources and measurability	Disaggregation	Timeline
Household services					
Safely managed sanitation	Percentage of population using safely managed sanitation services	Population using a basic sanitation facility[2] which is not shared with other households and where excreta is safely disposed in situ or transported to a designated place for safe disposal or treatment.	Household surveys can provide info on types of sanitation facilities and disposal in situ. Administrative, population and environmental data can be used to estimate safe disposal/transport of excreta, when no country data are available	Urban/rural Wealth Affordability Others TBC	Elements from hh surveys can be reported short term. Excreta management will initially be estimated globally and regionally, and progressively at country level.
Basic sanitation	Percentage of population using a basic sanitation service	Percentage of population using a basic sanitation facility[8] not shared with other households	Household surveys	As above	Immediate
Shared sanitation	% of population using a shared sanitation service	Percentage of population using a basic sanitation facility shared with other households	Household surveys	As above	Immediate
Unimproved sanitation	% of population using an unimproved sanitation facility	Percentage of population using unimproved sanitation facilities[9], with or without sharing with other households	Household surveys	As above	Immediate
Open defecation	% of population practicing open defecation	Percentage of the population practicing open defecation (defecating in bushes, fields, open water bodies or other open spaces)	Household surveys	As above	Immediate
Extra-household services					
Basic sanitation in schools	% of pupils enrolled in schools that provide basic sanitation services	Percentage of pupils enrolled in primary and secondary schools with functional basic separated sanitation facilities for males and females on or near premises[10]	Institution surveys, admin data, EMIS	Urban/rural Gender	Medium term (monitoring package needs to be standardised; monitoring systems require national and international support)
Basic sanitation in health care facilities	% of beneficiaries using health care facilities providing basic sanitation services	Percentage of beneficiaries using health care facilities with functional basic separated sanitation facilities for males and females on or near premises[11]	Institution surveys, admin data, EMIS	Urban/rural	

[7] The top row is the proposed SDG indicator, the rest are part of the global reporting 'ladder' used by JMP.

[8] Basic sanitation facilities [MDG 'improved' indicator] are: flush or pour flush toilets to sewer systems, septic tanks or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets.

[9] Unimproved sanitation facilities [MDG 'unimproved' indicator] include: flush/pour flush not going to sewer/septic/pit, pit latrines without a slab, hanging and bucket latrine

[10] At least one toilet/latrine for every 25 girls, at least one toilet/latrine for female school staff, a minimum of one toilet/latrine and one urinal for every 50 boys and at least one toilet for male school staff

[11] At least one toilet for every 20 users at inpatient centres, at least four toilets – one each for staff, female, male and child patients – at outpatient centres

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B.2.3 Proposed indicators for monitoring hygiene[12]

Hygiene	Indicator	Definition	Data sources and measurability	Disaggregation	Timeline
Household services					
Hand washing at home	Percentage of population with hand washing facilities with soap and water at home	Population with a hand washing facility with soap and water in the household	Household surveys	Urban/rural Wealth Affordability Others TBC	Immediate
Extra-household services					
Hand washing in schools	Percentage of pupils enrolled in schools with basic hand washing facilities	Percentage of pupils enrolled in primary and secondary schools with functional handwashing facilities, soap (or ash) and water available to girls and boys.	Institution surveys, admin data, EMIS	Urban/rural Gender	Medium term (monitoring questions need to be agreed; monitoring systems require national and international support)
Menstrual hygiene management in schools	Percentage of pupils enrolled in schools with basic menstrual management facilities	Percentage of pupils enrolled in primary and secondary schools with adequate and appropriate sanitary facilities for washing and change management and disposal of menstrual waste. These facilities must offer privacy, safety and dignity to menstruating students and teachers.	Institution surveys, admin data, EMIS	Urban/rural Gender	
Hand washing in health care facilities	Percentage of beneficiaries using health care facilities with basic hand washing facilities	Percentage of beneficiaries using health care facilities with adequate hand hygiene supplies (running water, liquid soap, single use towels/alcohol-based hand rinse) available at key locations.	Institution surveys, admin data, HMIS	Urban/rural	Medium term (monitoring questions need to be agreed; monitoring systems require national and international support)
Basic menstrual hygiene management in health care facilities	Percentage of beneficiaries using health care facilities with basic menstrual management facilities	Percentage of beneficiaries using health facilities with basic separated sanitation facilities for females that provide privacy; soap, water and space for washing hands, private parts and clothes; and places for changing and disposing of materials used for managing menstruation.	Institution surveys, admin data, HMIS	Urban/rural	

[12] The top row is the proposed SDG indicator, the rest are part of the global reporting 'ladder' used by JMP.

C.1 Proposed Indicators and monitoring framework for Wastewater in the SDGs

Wastewater discharge is a major health hazard and this serious issue is receiving increasing political and social important under rapid urbanization and other rapidly changing socio-economic context. It is relatively easy to monitor as shown below and is clearly actionable. Water quality represents outcome of all pollution and pollution reduction activities, which is complementary to wastewater discharge element of target 6.3, and can be useful for all other water-related targets.

Target 6.3 – By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse by x% globally

Target language	Normative definitions of target elements
improve water quality by	Implies adequate quality of receiving water bodies so that they do not present risk to the environment or human health.
Reducing pollution	Pollution reduction implies both minimizing production of pollutants at source and reducing the discharge of polluting substances. Both point and non-point of pollution need to be considered .Point sources are frequently associated with discharges of domestic/municipal wastewater and a large proportion of non-point sources come from run off from both rural and urban areas. These sources constitute both agricultural runoff in rural areas and contaminated surface water from urban areas.
Eliminating dumping	Dumping of wastes refers to the inadequate disposal of both liquid and solid wastes. It relates to the disposal of solid wastes and associated liquid components that are leached into water resources A good example would be the leachates produced by poorly managed solid waste disposal sites. These constitute a risk from both the possibility of hazardous substances present and their oxygen-depleting capacity
And minimizing release of hazardous chemicals and materials	This relates to the discharges of certain hazardous substances, which are currently defined in the conventions of Basel, Rotterdam and Stockholm. Management is related to waste minimization strategies , however there is a component that relates to the impact of treatment on such components, and illegal dumping
Halving the proportion of	Refers to: a) For domestic wastewater (sewage and faecal sludge) the halving the proportion of population for whom wastewater is untreated as defined by ladders below. b) For industrial wastewater halving the proportion of flows from permitted hazardous industries (as defined by ISIC) not meeting discharge permits.
Untreated wastewater	Refers to: a) Domestic wastewater (sewage and faecal sludge) where treatment is defined by ladders ranging from no treatment, primary, secondary, tertiary to advanced treatment for on-site and off-site facilities. b) hazardous (as defined by ISIC) industrial wastewater discharges not meeting national standards as verified by monitoring against discharge permits.
And increasing recycling	Implies industrial process wastewaters recycled on-site or to another industrial use
And safe reuse	Implies direct use of effluent from municipal wastewater treatment plants for all uses. The term 'Safe reuse' may be defined using a combination of treatment level and use type as a proxy for 2006 WHO Guidelines for safe use of wastewater.

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C.1.1 Proposed indicators for monitoring wastewater management

Wastewater ladder[13]	Proposed indicator	Definition	Data sources and measurability	Disaggregation	Timeline
Safe treatment of wastewater	Percentage of wastewater safely treated	Proportion of wastewater generated both through domestic (sewage and faecal sludge), as well as industrial sources safely treated compared to total wastewater generated both through domestic and industrial sources	To build on the monitoring framework of JMP, AQUASAT, IBNET, GLAAS etc., as well as pop density, land-use/land-cover data from earth observations. The calculation of the indicator value as derived from the framework is the amount treated (off-site and on-site) divided by the total amount of waste produced. The indicator for domestic wastewater could be expressed in flows or based on population as expressed in target 6.2. Data will come from a variety of sources combining utility and regulator data for off-site and potentially household surveys and measured data for onsite supplemented by modeled estimates where no reliable national data exist.	Domestic (on and off-site) and industrial wastewater	Global baseline estimates in 2016. Wastewater treatment will initially be estimated globally and regionally, and progressively at country level.

[13] For the domestic wastewater (sewage and faecal sludge) part this is the next level of the sanitation ladder described in 6.2.

D.1 Proposed indicators against the criteria for global monitoring

Indicators for global monitoring should follow some guidelines and criteria, which are different from those for other monitoring purposes. Here are the criteria used:

1. Prominence in the monitoring of major international declarations to which (all) member states have agreed, or has been identified through international mechanisms such as reference or interagency groups as a priority indicator in specific program areas.
2. Scientifically robust, useful, accessible, understandable and SMART (specific, measurable, achievable, relevant and time-bound).
    - Cost effective measurability by countries
    - Specific and time-bound
    - Achievable depends on affordability and capacity, which need further assessment for different categories of countries
    - Relevant as assessed by Member States.
3. Strong track record: preferably supported by an experience and international database.
4. Used by countries in the monitoring of national plans and programmes. Tried and tested by individual countries, regions or globally as part of intergovernmental processes
5. Methodological soundness, and easy to understand and communicate, as identified in the report Lessons Learned from MDG Monitoring of the IAEG-MDGs[14].
6. Possibility for aggregation/disaggregation.
7. Universal but adaptable to local conditions.

All indicators proposed in this document are matched against the key criteria listed above.

Criteria for indicator selection	Indicator area			
	Water	Sanitation	Hygiene	Wastewater
Prominence, interagency monitoring	Yes	Yes	New	Yes
SMART	Yes	Yes	Yes	Yes
Strong track record	Yes	Yes	New	New
Methodologically sound	Yes	Yes	Yes	Yes
Easy to understand	Yes	Yes	Yes	Yes
Cost effective to monitor	Yes	Yes	Yes	Yes
Country capacity	Yes	Yes	Yes	Yes

E Data Sources

Household surveys will remain the primary source of data for JMP and the foundation for monitoring wastewater in the post-2015 period. But other data sources will be progressively integrated including, inter alia, from administrative records, regulatory frameworks and from earth observations. Some of these indicators can be monitored immediately post-2015, while others will be developed over the short, medium, or long term (see above tables).

[14] http://unstats.un.org/unsd/broaderprogress/pdf/Lesson%20Learned%20from%20MDG%20Monitoring_2013-03-22%20%28IAEG%29.pdf

F Means of implementation

For the purposes of JMP monitoring, in the immediate term, issues of safe management of water or sanitation services will be monitored by integrating data from household surveys, combined with other surveys on water quality, administrative records for other national data sources, as well as data from earth observations on population density, or land-cover/land-use. The methodology to contract the indicators above can follow the approach shown for the domestic wastewater treatment as shown below.

Since wastewater (sewage and faecal sludge) management and treatment is a new topic for global monitoring, and from the public health point of view an increasingly important issue for the SDG period, the following paragraphs show how this can be implemented for the global monitoring purposes. It is shown separately for domestic and industrial wastewater parts. The latter is a combination of hazardous and non-hazardous waste, as shown below.

The following two sections show separately how domestic and industrial wastewater measurements could be made for global monitoring purposes. As mentioned above, this indicator will be reported on increasingly available verified national data.

F.1 Measurement of domestic wastewater treatment/safe management of sanitation

The following gives a demonstration of how various data sources could be integrated for monitoring domestic wastewater (sewage and faecal sludge) treatment. This methodology equally applies to the indicator for safe management of sanitation services and can be used in the absence of better country level data from service providers or regulators.

1. JMP maintains a vast database (www.gimsinitiative.org) primarily from household surveys, where data is collected on the use of various sanitation facilities that are used by people around the world.
2. Based on the types of toilets people use, and the country they are used in, safety (or faecal leakiness) factors could be attributed to a specific country and therefore a country could be shown as having x% of the faecal matter released to the environment. At the next level, this could be combined with the population density, and actual use of type of toilet in a given location, to show the severity of the situation. The following illustration could explain how to calculate % of domestic wastewater (sewage and faecal sludge) safely managed and treated based on the information of types of toilet used and level of development or income status of a country or some other use of covariates to estimate the degree of safe management and treatment (or faecal leakiness) from the use of particular toilets.

	Integrated safety factors, by country (income level)			
Sanitation facility used	High income	Upper middle income	Lower middle income	Low income
Sewer to piped	100	60	40	20
Sewer to pit	95	90	85	80
Sewer to unknown	95	60	40	20
Sewer to other	95	60	40	20
Sewer to elsewhere	95	60	40	20
Septic tank	100	80	75	70
VIP	100	90	85	80
Improved pit	100	90	85	80
Unimproved pit	95	80	70	60
Traditional latrine	90	80	70	60
Composting toilet	100	100	100	100
Hanging latrine	0	0	0	0
Bucket latrine	0	0	0	0
Open defecation	0	0	0	0

3. The overall safety comes from a linear combination of steps including direct discharge to the environment, discharge after initial emptying, improper transportation, or lack of efficiency or overload of treatment plant if the domestic wastewater reached there, and therefore part of it never gets treated. In other words, the overall safety factor shown above for a given type of sanitation facility used by individual households.

$$f = \sum_{i=1}^{n} a_i f_i \, , where \; f_i = \prod_j f_{ij}$$

Here a_i is the proportion of the population using facility type *i*, and f_{ij} is the safety factors for facility *i* due to different steps *j* such as transportation and treatment. The factors f_i shown in the table above are for the demonstration purposes of this note, but the actual factors will come from actual country situations, be it from literature reviews, focused studies or in-country consultation. GEMI is embarking on a pilot exercise in selected countries around the world to verify the approach.

4. The above model could be used to get a baseline estimate of the status of safe domestic wastewater (sewage and faecal sludge) management and treatment in a given country or region of the world. But to have more local policy relevant and action oriented advocacy measure, it is possible to go deeper. This is where the use of data from earth observations could prove powerful.
5. The 'overall' estimates could further investigate the actual use of types of toilets in different parts of the country and if the likelihood of unsafe domestic wastewater (sewage and faecal sludge) management and treatment is prone to take place in densely populated (urban) areas, or what kind of land-cover or land-use there is, whether their proximity has potential to contaminate water bodies. Population

density, land-use/land-cover, and other 'public health factors' could be combined with simple safety factors as above to get a fuller picture to get to the final figure reported against the indicator.

6. GIS data from USAID supported Demographic and Health Surveys can give us cluster level data of use of actual types of toilets shown above. Multiple GIS layers of information: types of toilets, and associated safety factor, could be overlaid with population density data from LANDSCAN database, along with land-cover data could give us even richer information than shown in the table above and give local or other policymakers a better understanding of on targeted interventions, or actionable policy formulation or targeted funds allocation for upgrading of sanitation facilities and domestic wastewater (sewage and faecal sludge) management and treatment and in turn improved water quality.
7. According to this demonstration exercise, 38% of the domestic wastewater (sewage and faecal sludge) is not safely managed and treated, see map below. Further integration of earth observations data on population density, land-cover/land-use are shown in the Annex to show how more policy relevant data could be generated for this indicator where safe treatment is not just about lack of leakiness, but also a function of population density, what the land-cover or land-use is where unsafe treatment is taking place, and therefore puts population at greater risk or pollutes the environment.

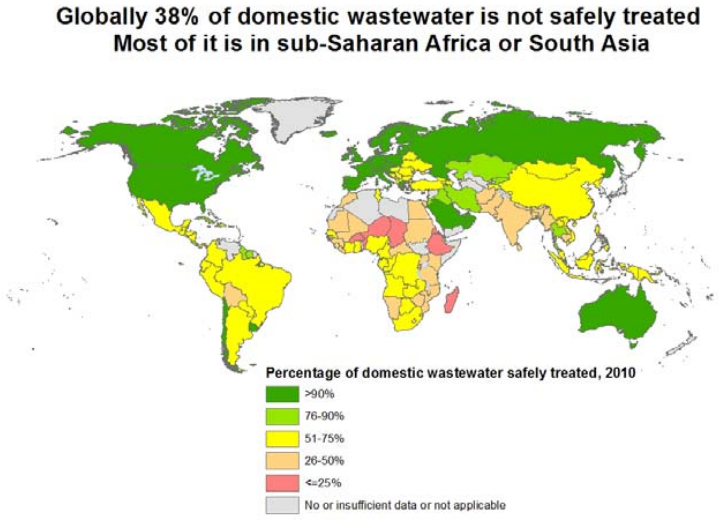


Fig. 1 Proportion of domestic wastewater safely treated

F.2 Measurement of industrial wastewater treatment

The total volume of industrial wastewater (the denominator) can be reliably estimated from an inventory of industries, which will be available in the vast majority of member states. This can be populated from databases and records held by Ministries of Industry, Tax offices, local authority registries etc. For each industry, records will be available on the amount of

water they abstract from municipal supplies or from boreholes or other sources. Given the knowledge of the type of industry (from International Standard Industrial Classification from all economic activities, revision 4, ISIC Rev4[15]) and a mass balance of products in and out, the proportion of wastewater flow generated as waste water can be estimated.

The proportion of those industries which deal with hazardous substances, (defined according to pollutants documented in the various conventions (Stockholm, Basel and Rotterdam) and classified by ISIC codes can then be computed. The breakdown of treated wastewater can be calculated based on compliance records, related to national standards. Unless verified otherwise, through audited compliance records, the waste generated will be considered untreated.

The method described above might not cover small-scale or informal industries. As most of these activities occur in urban centres, or in their peripheries, available GIS tools, including high resolution remotely sensed images could be used to estimate such components.

Methodologies are being developed for point sources of pollution emanating from farms and agricultural establishments, where data from earth observations could be of use. Attention also needs to be given to landfills and disposal sites that produce significant quantities of leachate. It must also be borne in mind that some industrial processes have so-called “godfather installations”, i.e. although having ceased production, they still are responsible for continued emission of pollutants.

Baseline indicators are therefore reliably measured using existing data, and various sources of information. In addition to such indicator for global monitoring, member states can be encouraged to progress “up the monitoring ladder” by increasingly refining monitoring systems and protocols as they see fit.

In terms of definitions, industrial wastewater is either directly discharged or in the case of a large proportion of non-hazardous industrial waste, is combined with domestic wastewater in a municipal sewer. Municipal wastewater would therefore be defined as a combined mix of domestic (black and grey water) together with waste water from commercial and non-hazardous industries. So called “trade wastes” are frequently non-hazardous wastes, with approved discharge permits. In addition to the records cited above, the possibilities for data from utilities can also be used to further refine estimates.

G Proposal for monitoring progressive elimination of inequalities in access

The SDG targets can only be considered achieved when met for all sub-groups within the population as SDG framework calls for data disaggregation by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant

[15] ISIC revision 4 from UN Statistical Division: http://unstats.un.org/unsd/cr/registry/isic-4.asp

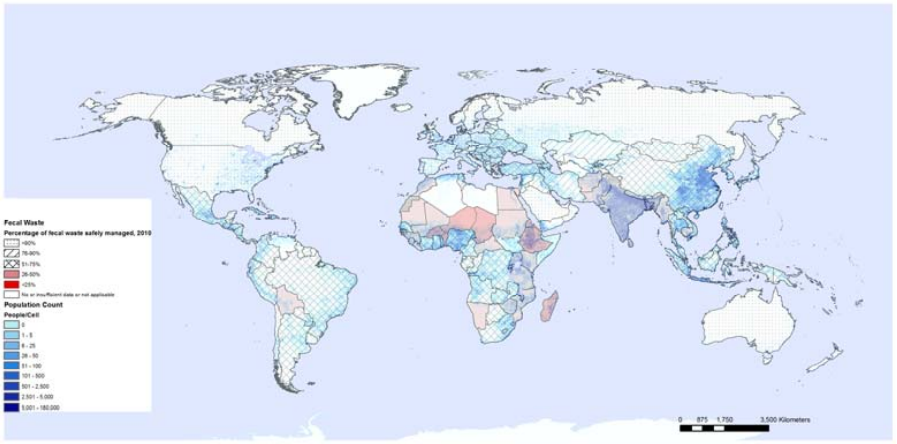
in national contexts. JMP's current disaggregation will extend beyond urban/rural to more systematic disaggregation of wealth stratifiers within these geographic areas, as these are readily done from major international household surveys. Additional sub-national stratifiers could also be extracted from household surveys JMP uses. Use of water and sanitation services for distributed at such sub-national levels integrated with grater spatial/temporal resolution data like those from earth observations could give interesting policy relevant message.

Affordability of water and sanitation services is an important cross-cutting concern. JMP plans to use available data on household expenditure, tariffs, income and poverty to start benchmarking affordability across countries and reporting national, regional and global trends.

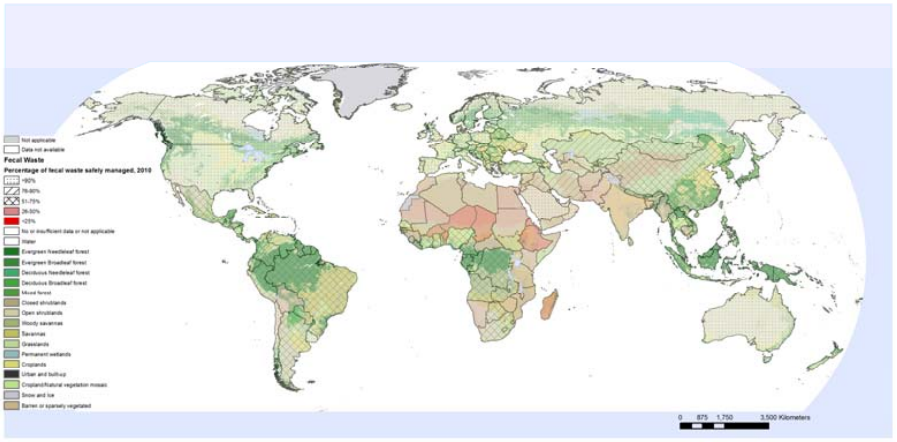
Medium/long term. Most household surveys and censuses used by JMP database do not separate **informal urban settlements** or slums which often fall outside official enumeration areas. Monitoring of WASH in "slums" poses additional challenge in that many definitions of "slums" include lack of access to water and sanitation, creating a tautological problem. In collaboration with researchers JMP can explore new methods to characterize informal urban settlements and water and sanitation services, for example using Earth Observations, water point mapping, crowd-sourcing, or other innovative approaches. **Locally important disadvantaged groups**, by definition, will not be the same in all settings. Many cases of locally important stratifiers are already found in household surveys but it would be preferable for Member States to go through a participatory process to identify locally disadvantaged groups and design monitoring instruments accordingly. Monitoring of disadvantaged groups is difficult to reach through conventional household surveys. In such cases, alternative mechanism like rapid assessment type surveys could render more efficiently information on target sub-populations, and JMP will collaborate with researchers on innovative approaches to monitoring these. Citizens network, or crowd sourced data could be explored as an alternate measure. It is likely that other sectors would have a similar interest in sub-populations, and could collaborate on innovative surveys.

Household surveys and housing censuses used by JMP data, use household as the lowest unit for information on WaSH access, and is therefore not possible to accurately measure intra-household inequalities such as **sex**, **age**, or **disability**. Specially designed measurements can elicit information regarding intra-household inequalities, and JMP will collaborate with researchers to devise and test methods for doing so. To have these complex issues as part of a regular data collection mechanism (such as DHS maternal health module, or SIMPOC child labour module), and their uptake by national authorities could be a long-term prospect. Such individual-level inequalities could be more efficiently monitored using optimized methodologies and dedicated surveys applicable across various sectors. Various other data sources could be considered including citizen and consumer networks or crowd sourced data.

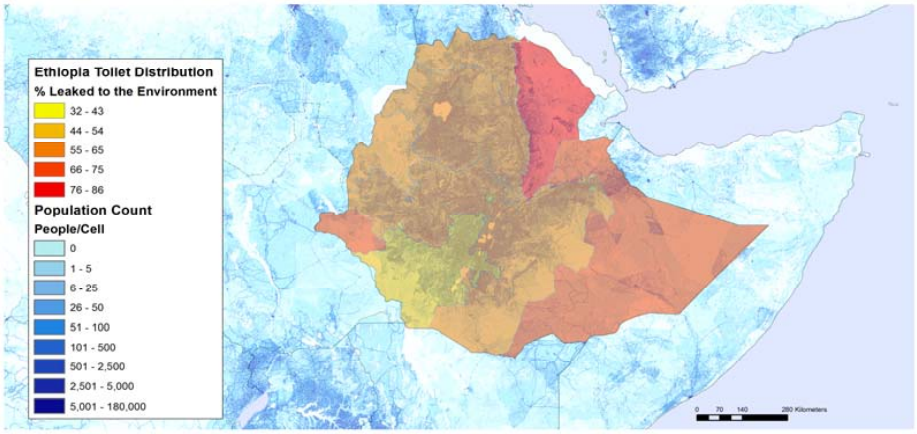
Annex



i) Density of population versus treatment of domestic wastewater



ii) Land-cover versus treatment of domestic wastewater



iii) Density of population versus leakiness from various sanitation services, Ethiopia sub-national