SANITATION AND WATER FOR ALL

EASY-TO-USE GUIDELINES TO APPLY THE WASH SDG COSTING TOOL

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Acknowledgments
The WASH SDG costing tool was developed for country application by UNICEF and the World Bank based on the global costing study implemented by the World Bank.[1] This guideline was developed collaboratively by the SWA Secretariat and UNICEF.

Download the WASH SDG costing tool (xlsm 7.7MB):
https://bit.ly/WASH-SDG-Costing-Tool

1 *Hutton G. & Varughese M. (2006). "The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene". The World Bank. Water and Sanitation Program.*

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I Background

The 2030 Agenda for Sustainable Development introduced a new level of ambition for water, sanitation and hygiene (WASH) services, encouraging countries to aspire to even higher levels of service and ensure everyone everywhere has access to WASH services, thus leading to greater health, economic, social, and environmental benefits.[2]

The definitions and indicators associated with the Sustainable Development Goals (SDGs) have undergone important changes compared to the Millennium Development Goals (MDGs), with implications for both WASH sector needs and financing. In this sense, countries will need to have a notion of the costs associated with the WASH-related targets of SDG 6, to develop the funding streams and financing mechanisms to achieve them. An important contribution to this effort was a global study on the Costs of Meeting of 2030 SDG Targets on WASH, published by the World Bank in February 2016. This study comprehensively assessed the global costs of meeting the WASH targets, focusing on households: (1) achieving universal and equitable access to safe and affordable drinking water for all (target 6.1); and (2) achieving access to adequate and equitable sanitation and hygiene for all and ending open defecation (target 6.2).

The World Bank study[3] used an Excel-based cost model to estimate the costs of achieving the SDG WASH targets in 140 countries (representing 85% of the world's population). This model was applied on an individual country basis and then the results were aggregated to yield the regional and global totals or averages, weighted by country population size. The model estimated the costs to meet the basic WASH standards (like the MDG definitions) as well as the safely managed standard defined by the SDG indicators 6.1.1 and 6.2.1, and presented costs by rural and urban areas and by population wealth quintile.

It is important to note that the underlying cost data for this exercise were gathered from the best available secondary sources (i.e. available published and grey literature and other databases) and used a first estimate of baseline WASH access rates that was made available by JMP in 2014. Hence, due to uncertainties in the data, a sensitivity analysis was conducted that indicated the likely ranges on the cost estimates at world and regional levels. Thus, the cost estimates presented in the report were useful for having ballpark estimates on what it would cost at global and regional levels to meet targets 6.1 and 6.2, and the overall likely differences between rural and urban and between achieving different service levels.

This costing model was identified as a key tool that would be updated with recent data by countries that participated in the Sanitation and Water for All (SWA) High-level Meetings in April 2017. Around 30 countries used the tool, and

2 *The World Bank & UNICEF (2017). "How can the financing gap be Filled?" Discussion Paper. A paper submitted by the World Bank and UNICEF to support the Sanitation and Water for All Finance Minister Meeting Preparatory Process.*

3 *Hutton G. & Varughese M. (2006). "The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene"*. The World Bank. Water and Sanitation Program.

substituted some of the data inputs used by the World Bank study with better local estimates based on expert consultations and alternative data sources. Hence, this exercise enabled countries to obtain aggregated cost estimates for achieving universal access to water, sanitation and hygiene for households, and to have a better level of confidence given that the data inputs were locally vetted. At this point, countries had received preliminary estimates of the SDG WASH baseline estimates which was to be used for the 2017 report of the WHO/ UNICEF Joint Monitoring Programme.

The purpose of this guideline is to describe how the costing tool can be utilized, to enable independent application of the tool by countries. It is expected that these guidelines might be utilized by countries that expressed interest in obtaining cost estimates to reach the WASH SDGs in the aftermath of the SWA High-level Meetings. These guidelines enable the user to understand how to customize the cost analysis for their country. With further adaptations, the tool can be used to make sub-national estimates (e.g. province, region or state). The user should note that even after country-specific values have been validated, the outputs should still be interpreted with caution, given the simplicity of the cost model and the remaining uncertainties in many of the underlying values.

II Overview of the wash costing tool

The WASH SDG Costing Tool is a model that is based on an Excel file which is available in English, French, Spanish and Portuguese from the following link:

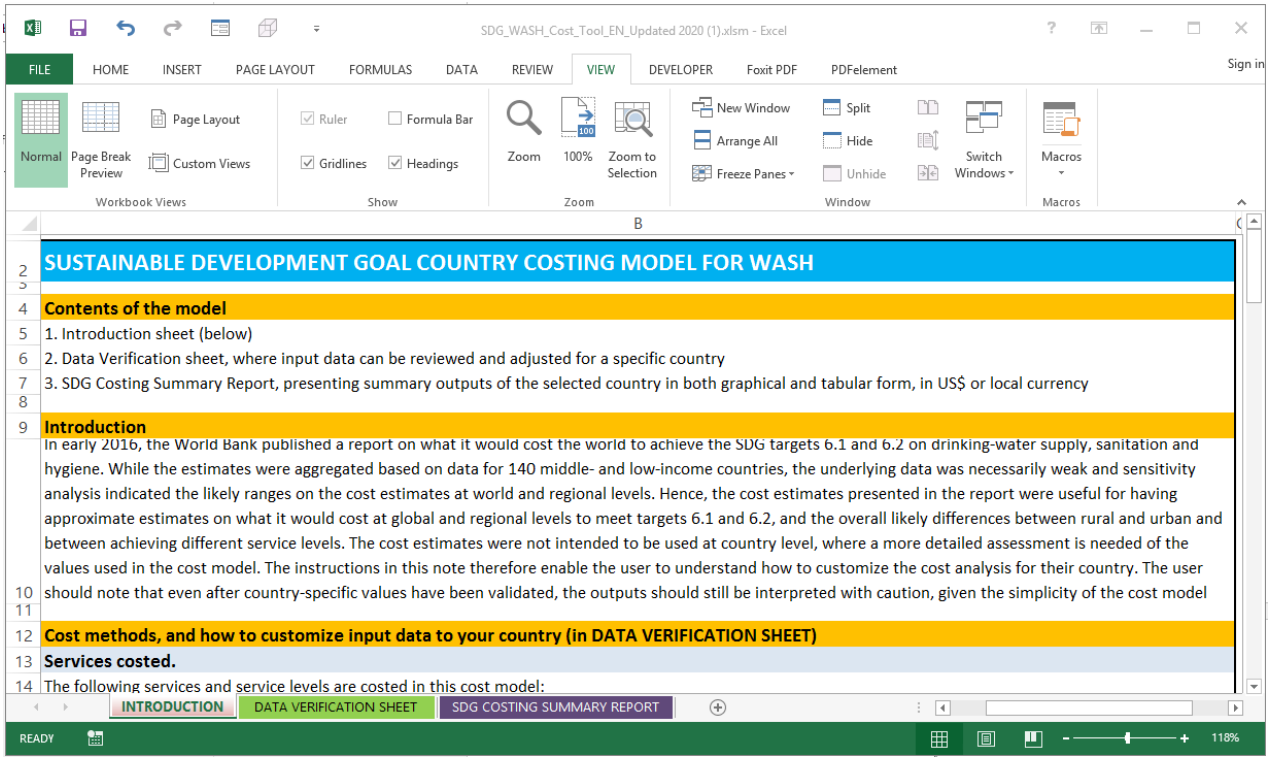
https://bit.ly/WASH-SDG-Costing-Tool
(xlsm 7.7MB)

The file has three sheets:
(i) Introduction,
(ii) Data Verification Sheet, and
(iii) SDG Costing Summary Report.

For security purposes, each sheet is locked and it is important to unlock them for editing. To unlock the sheets, please right click on the sheet's name, select 'unprotect sheet' and type the password "sdg". It is strongly recommended that you save a copy of the working document and keep the original file to avoid any mistakes or errors that may happen when editing the file. Once the editing to the sheets is completed, it is suggested that you lock them back again to avoid any undesired edits.

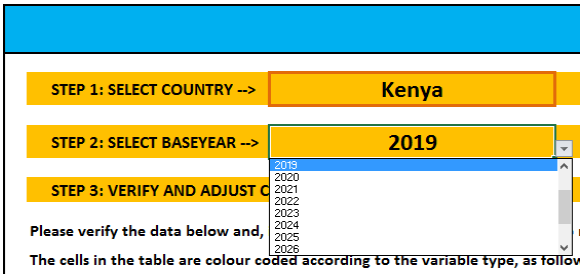
2.1. Introduction Sheet

This sheet provides a summary of the main contents of the model, a brief introduction of the costing tool and the cost methods utilized in the model, including which services would be costed (water, sanitation and hygiene), the inputs to be provided in the Data Verification Sheet and how to interpret the results provided in the SDG Costing Summary Report in USD or Local Currency (LC).

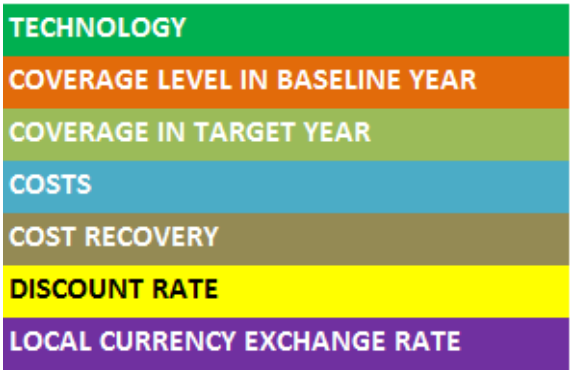


2.2. Data Verification Sheet (DVS).

The **first step** is to select your country in cell E4. The file will display automatically the values stored for your country including both inputs and results. **Second**, choose your baseline year (cell E6). This can be the current year, or the latest year for which you have the needed data inputs (e.g. coverage, unit costs). The results will be available in the sheet SDG Costing Summary Report in USD or Local Currency (LC) in tables and graphs.



The inputs that the user may adjust are the editable values in the DVS sheet. The input table displayed is color coded according to the variable type.



The first two columns (columns C and D) display the WASH technology option to be costed in both urban and rural areas. The **service** options under column C include:

Basic water: Basic water supply service includes an improved community water source within a 30-minute round-trip, such as a tub well or dug well.

Safely managed water: This service includes an improved source located on the premises, available when needed and free of contamination.

Basic sanitation (onsite only): This service refers to an 'improved' sanitation facility that is for the exclusive use of a single household.

A fixed-point defecation: A minimum sanitation solution leading to the elimination of open defecation.

Safely managed sanitation: The service includes a toilet (improved facility) not shared with other households and where excreta is safely disposed in situ or treated off-site.

Handwashing with soap: Presence of handwashing station, water and soap available (or other appropriate cleaning material).

The third and fourth columns (columns E and F) present the specific technology solution for each service by rural and urban areas. It is highly recommended to stick to the technology solutions identified, however, if some countries find that there are other technology solutions available, they can propose those solutions based on the minimal criteria set in the definitions of each solution (column E). In this case, an appropriate unit cost data should be provided for the selected technology option. [4]

4 *The costing tool has enabled the DVS for editing and the adjustments to this sheet might be introduced by WASH specialists. In the case of the High-level Meetings, some countries decided to hire a consultant to update some information and prepare the Country Summary Report. In other cases, there were reviews and technical support from analysis groups made up of governmental counterparts, NGOs, and UNICEF specialists.*

The cost model calculates the costs based on either one or two technology options, depending on the service. Hence the proportion of population receiving each of these two options can be adjusted by the user. When an adjustment is made in Column F, the total must sum to 100% (e.g. 70 + 30, or 20 + 80). In some cases, only 1 solution is proposed to reach the level of services required by the definition, such as safely managed water.

The fifth column (column G) displays the estimated **service coverage level for the baseline year**. Estimates are based on JMP data for improved water and sanitation. Presence of handwashing station with soap and water is based on available surveys reporting, compiled by the JMP.

Estimates for safely managed water and safely managed sanitation are based on available literature and assumptions, outlined in the World Bank global cost report. The user can adjust the current coverage based on more recent available from the JMP (e.g. the 2019 report), or from alternative data sources if they better reflect the coverage rate. If any values are to be changed, the formula displayed will be replaced by updated data.

The sixth column (column H) reflects the coverage target for 2030. By default, the model assumes a target of 100% to be reached by 2030, to reach the SDG targets 6.1 and 6.2. However, countries may adjust this target based on budget restrictions and other considerations.

A B	C	D	E	F	G	H
	SERVICE	RURAL / URBAN	TECHNOLOGY	HOUSEHOLDS WITH TECH. OPTION	SERVICE COVERAGE LEVEL BASELINE YEAR	COVERAGE TARGET 2030
	Basic Water	Urban	Tubewell	50%	69%	100%
			Dug well	50%		
		Rural	Tubewell	50%	49%	100%
			Dug well	50%		
	Safely Managed Water	Urban	Safely managed water	100%	31%	100%
		Rural	Safely managed water	100%	4%	100%
	Basic Sanitation (onsite only)	Urban	Septic tank	50%	31%	100%
			Pit latrine	50%		
		Rural	Wet pit latrine	50%	29%	100%
			Dry pit latrine	50%		
	Any fixed point defecation	Rural	Any latrine, including unimproved	100%	85%	100%
	Safely Managed Sanitation (fecal sludge management or sewerage only)	Urban	Sewerage with treatment	50%	32%	100%
			Septic tank with treatment (FSM)	50%		
		Rural	Pit latrine with treatment (FSM)	50%	34%	100%
			Sewerage with treatment	50%		
	Handwashing with soap	Urban	Station with soap and water	100%	13%	100%
		Rural	Station with soap and water	100%	7%	100%
	DISCOUNT RATE (> 0%)	5%				

Columns I, J and K contain unit capital cost data.

			I	J	K
SERVICE	RURAL / URBAN	TECHNOLOGY	CAPITAL COSTS (TOTAL)		
			COSTS		
			CapEx	Software	Duration
Basic Water	Urban	Tubewell	62.5	3.1	-20
		Dug well	29.8	1.5	-10
	Rural	Tubewell	42.8	2.1	-20
		Dug well	8.1	0.4	-10

The total **costs** of each technology solution include all the resources needed for setting up, operating and maintaining WASH services. Costs can be classified in those at the upfront investment, known as capital costs (CapEx); those required for major maintenance or renovation, known as capital maintenance costs (CapManEx); and those needed to make the service run on a day-to-day basis, known as operating costs (OpEx). All these costs are displayed in blue columns and reflects in USD per capita cost for each category.

The users can adjust the unit costs, for each type of WASH service and for rural/urban, separately, based on more precise values available from their country.

All cost values should be presented in USD and in values of the current year. Hence if cost data are available from a previous year, it should be adjusted to allow for the rate of price inflation.

For instance, the inflation rate of the main inputs to build a technology solution could be retrieved from household surveys or other source to be included in the estimations of current prices. When cost data are only available in the local currency, the values should be converted to USD – and later the results can be seen in both USD and local currency.

Capital costs are presented in terms of total cost per person reached. If local cost data are available for an entire area, or per household - the costs will need to be divided by the appropriate population covered to arrive at cost per person reached. The following three variables can be adjusted:

- **CapEx per person reached.** These typically include the funds spent on hardware or infrastructure, and the costs of physically putting it into place (labor, equipment, etc.).
- **Software cost per person reached with the hardware**. These costs are necessary to sensitize populations to the intervention and/ or change their behaviors and/or generate demand for the service (i.e. communicational campaigns and others). It can also include other program, management or administrative costs if not included under the previous category.
- **Duration of life (lifespan) of the capital hardware**. This is the number of years before the hardware needs to be completely replaced. The model requires a negative number to be entered (i.e. with '-') otherwise the model will not function.

I	J	K	L	M	N	O	P	Q	R	S	T
FINANCIAL COST PER CAPITA (US$ in 2016) with DISTRIBUTION OF COST RECOVERY											
CAPITAL COSTS (TOTAL)					MAINTENANCE COSTS (TOTAL)				OPERATING COSTS (ANNUAL)		
COSTS			COST RECOVERY (%)		COSTS		COST RECOVERY (%)		COSTS	COST RECOVERY (%)	
CapEx	Software	Duration	Customer	Subsidy	CapManEx	Duration	Customer	Subsidy	OpEx	Customer	Subsidy
62.5	3.1	-20	20%	80%	18.8	-10	20%	80%	2.3	80%	20%
29.8	1.5	-10			8.9	-5			1.4		
42.8	2.1	-20	20%	80%	12.8	-10	20%	80%	2.3	80%	20%
8.1	0.4	-10			2.4	-5			0.4		

The default figures in the cost model are based on the assumption that 30% of the capital cost needs to be spent again after half of the expected lifespan of the hardware. However, these can be changed.

Maintenance Costs. These costs represent a rehabilitation or renovation of infrastructure to extend its lifespan until the duration of life (above) is reached.

- **Maintenance cost per person reached (CapManEx).** These typically include the funds spent on hardware (parts) and the costs of physically putting it into place (labor, etc.).
- **Operating cost (OpEx)** per person reached, per year. These reflect annual recurrent costs to provide the service, including labor, materials, chemicals, energy, transport, and overheads

Cost recovery. To introduce sustainability in WASH services provision and meet the costs of providing a service, it is common that costs will need to be shared among the beneficiaries (households) and the government. Based on the budget available from public or donor funds, a combination of customers' contribution and government's subsidy must be set.

By default, the model sets a costs proportion of 80% covered by public subsidies and 20% by consumers in the case of CapEx and CapManEx, while the proportion is inverse for OpEx (20% public subsidies and 80% customers). The cost sharing values should be altered based on local policies or financing available, and these can be adjusted to see what level of cost sharing is needed for it to be affordable from both public budget and customer perspectives. The public plus customer fractions must sum to 100% by row (e.g. 30% public and 70% private, or 10% public and 90% private) to ensure the costs are 100% financed.

SERVICE	RURAL / URBAN	TECHNOLOGY
Basic Water	Urban	Tubewell
		Dug well
	Rural	Tubewell
		Dug well
DISCOUNT RATE	5%	
LOCAL CURRENCY PER US$	1,000.0	
CURRENCY (SHORT FORM)	KSH	

Discount rate. The model utilizes a default discount rate of 5% to estimate the present value of achieving each target by 2030 (located in row 43, column D of the DVT sheet). Some countries issue a national regulation setting the discount rate. If your country has a different discount rate, please utilize it instead of the default value.

The impact of a higher discount rate is that future costs are lower when valued in the current period. A simple way to understand the discount rate is that if you have a known cost of US$ 100 in 5 years, you can put a smaller amount of money (US$ 78) in the bank now, earning compound interest of 5% per year, which will give you US$ 100 in five years.

The cost model assumes that one fifteenth (1/15) of the unserved population will gain access to each WASH service type between 2016 and 2030, so that in year 2030 universal service coverage is reached.

The calculations are made in USD, but for communicational purposes it is important to have the figures and graphs in **Local Currency (LC).** For the calculation, it is necessary to enter the exchange rate between US Dollars and your currency. In the example below, Kenya has an exchange rate of 1,000 KSH per USD.

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WASH expenditure. These values reflect total WASH expenditures made in the latest fiscal year for which data are available - preferably covering 2015 or after. All values should be converted to USD using current exchange rates. Funding data should be gathered, where possible, on four main funding sources: national government budget; decentralized government budget; and repayable loans and non-repayable grants from either ODA or other non-governmental sources. Preferably expenditure data should be used rather than budget data. The expenditure figures obtained commonly include hardware and software expenditure, and will be for both new service coverage and operation, maintenance and replacement of existing services.

Location and sub-sector		United States Dollars (US$) in 2016 Prices	
		VALUE OF EXPENDITURE / BUDGET	
SUB-SECTOR	RURAL / URBAN	NATIONAL BUDGETS SPENT	SUB-NATIONAL BUDGETS SPENT
Water supply	Urban	0	0
	Rural	0	0
Sanitation and hygiene	Urban	0	0
	Rural	0	0
WASH spending, not disaggregated	Urban	0	0
	Rural	0	0
Total	**Urban**	**0**	**0**
	Rural	**0**	**0**

The values to be entered can be drawn directly from the GLAAS survey financing section for 2016/17 (section D), if it has been filled out. If the data have not been gathered for the GLAAS survey, it is suggested to enter ballpark figures based on available documentation and interviews. It is preferable if the values can be validated by a range of stakeholders including government representatives and experts.

III Tracking calculations based on the results obtained

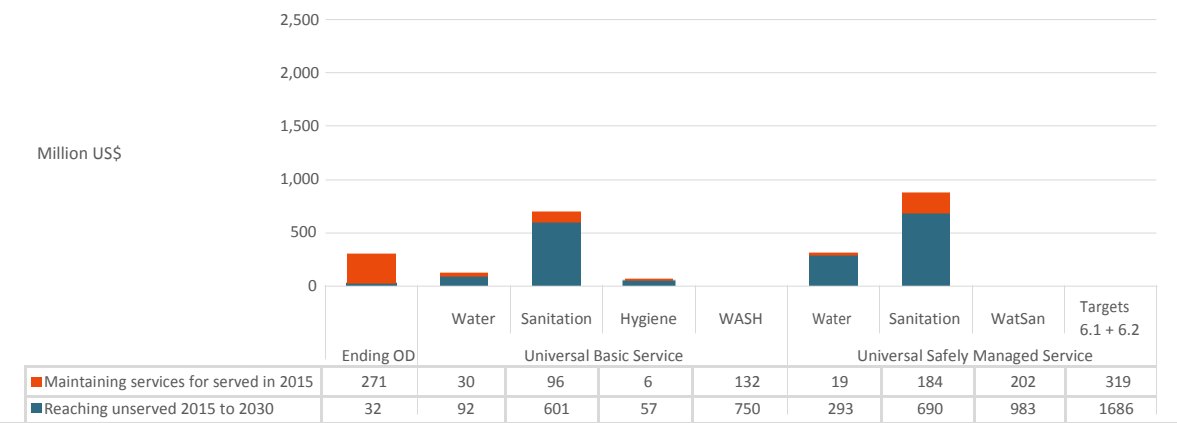
If you can replace updated data in the Data Verification Sheet, the changes will be reflected automatically in the SDG Costing Summary Report. Given that the model is automatized, there is no need to explore the hidden sheets where complex calculations occur. If the user wants to adjust the population projections, for example, this will have to be done in the underlying sheet.

Some calculations and graphics that provided below, using Kenya as an example.

3.1. Annual capital costs of reaching the entire population to achieve universal access

In the SDG Costing Summary Report in USD, a graph is displayed that summarizes the costing exercise, which is the Annual Capital Costs of reaching the entire population (maintaining the access to WASH services for those that already have the services in 2015 and reaching the unserved population from 2015 to 2030) to achieve universal access to WASH services.

Figure 1a. Annual capital costs of reaching entire population to achieve universal access of different service levels by 2030, in million US$



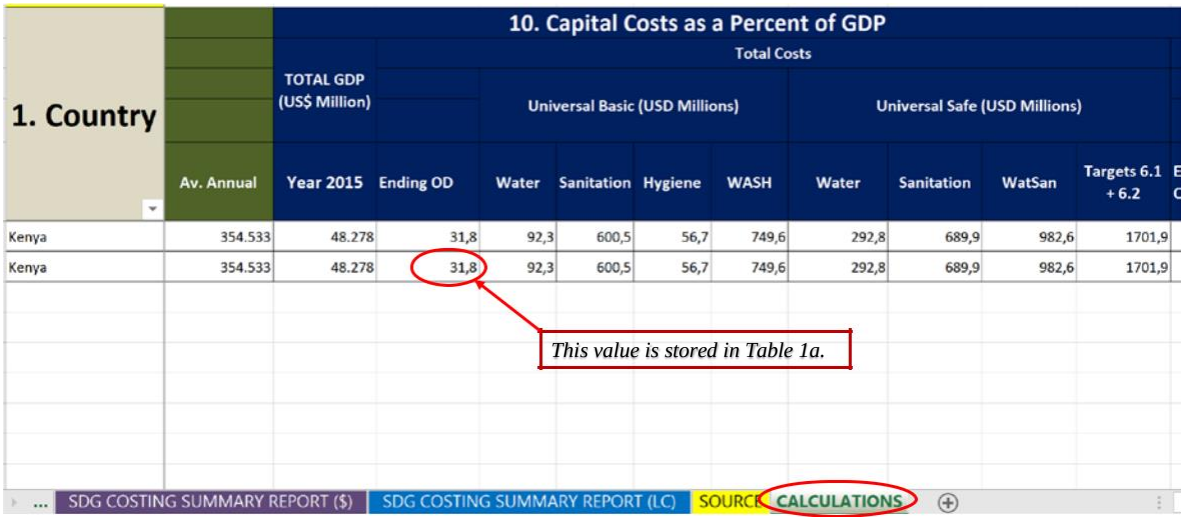
Maintaining services for served in 2015	271	30	96	6	132	19	184	202	319
Reaching unserved 2015 to 2030	32	92	601	57	750	293	690	983	1686

Figure 1a. is drawn retrieving the data summarized in Table 1a. which displays the annual capital costs of reaching the unserved in the period 2015-2030 and maintaining WASH services for those served in 2015. There are three analysis categories (i) Ending Open Defecation, (ii) Universal Basic Service, and (iii) Universal Safely Managed Service. The total annual costs of reaching 6.1 and 6.2 adds together the costs of universal basic sanitation and hygiene services, 50% of the basic water cost (as some population get basic before they go to safely managed), plus the costs of safely managed services for all the population. If unimproved latrines are selected to end Open Defecation, it is possible to calculate the cost of achieving ODF. However, if universal access to sanitation is achieved through a toilet – then ODF is automatically achieved (but it may take longer and cost more).

Table 1a. Annual capital costs of reaching unserved population to achieve universal access of different service levels by 2030, in million US$

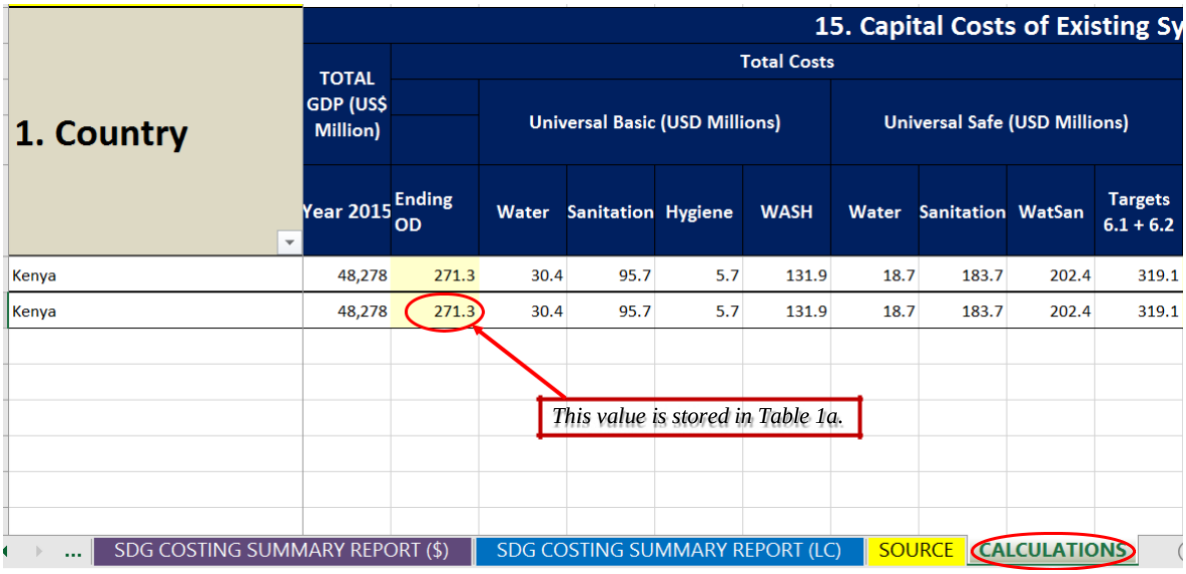
Population group served	Output	Ending		Universal Basic Service			Universal Safely Managed Service			
		OD	Water	Sanitation	Hygiene	WASH	Water	Sanitation	WatSan	Targets 6.1 + 6.2
Reaching unserved 2015 to 2030	Total cost	32	92	601	57	750	293	690	983	1686
Maintaining services for served in 2015		271	30	96	6	132	19	184	202	319
Reaching unserved 2015 to 2030	Percent	0.07%	0.19%	1.24%	0.12%	1.55%	0.61%	1.43%	2.04%	3.5%
Maintaining services for served in 2015	GDP	0.56%	0.06%	0.20%	0.01%	0.27%	0.04%	0.38%	0.42%	0.7%

One can track the cost calculations for (1) ending open defecation and maintaining OD status, (2) those who already have a sanitation service in 2015 and (3) those who do not have a sanitation service in 2015 but are expected to be served between 2015 and 2030. In the first case, the formula retrieves the value in the hidden Calculations Sheet, as the screenshot below shows. The cost of ending OD for the unserved in Kenya (according to the input data used in the global study) is USD 31.8 million.



In the second case, the costs for maintaining ODF for those already served in 2015, also retrieves data from the Calculations worksheet.

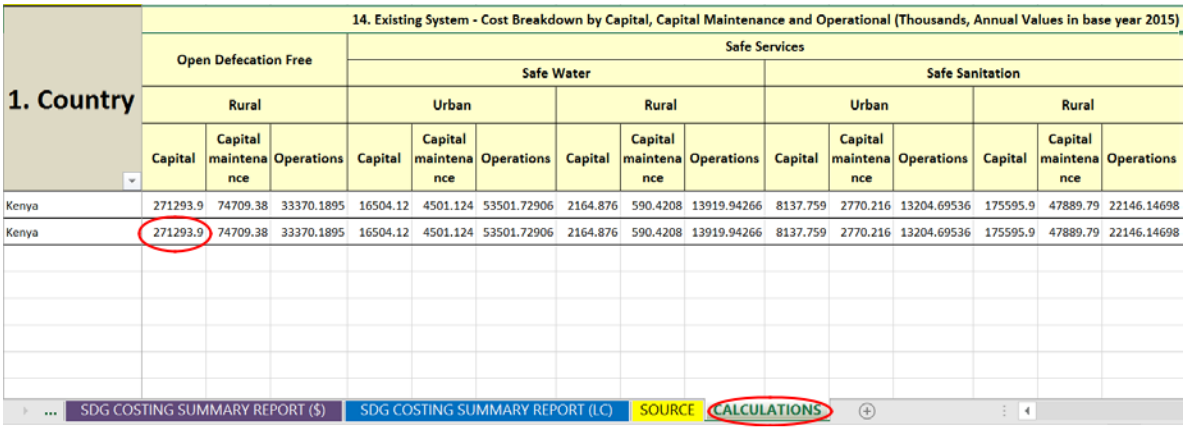
The estimated capital costs for achieving open defecation free (ODF) in rural areas is calculated by summing the unit costs of capital expenditure and software costs, and multiplied by the percentage coverage of population lacking a fixed point of defecation, and again multiplied by the 2015 population. Future costs are discounted by the length of time since the baseline year.



1. Country	15. Capital Costs of Existing Sy									
	TOTAL GDP (US$ Million)	Total Costs								
			Universal Basic (USD Millions)				Universal Safe (USD Millions)			
	Year 2015	Ending OD	Water	Sanitation	Hygiene	WASH	Water	Sanitation	WatSan	Targets 6.1 + 6.2
Kenya	48,278	271.3	30.4	95.7	5.7	131.9	18.7	183.7	202.4	319.1
Kenya	48,278	271.3	30.4	95.7	5.7	131.9	18.7	183.7	202.4	319.1

This value is stored in Table 1a.

... SDG COSTING SUMMARY REPORT ($) | SDG COSTING SUMMARY REPORT (LC) | SOURCE | CALCULATIONS



1. Country	14. Existing System - Cost Breakdown by Capital, Capital Maintenance and Operational (Thousands, Annual Values in base year 2015)														
	Open Defecation Free	Safe Services													
		Safe Water								Safe Sanitation					
	Rural	Urban			Rural			Urban			Rural				
	Capital	Capital maintenance	Operations	Capital	Capital maintenance	Operations	Capital	Capital maintenance	Operations	Capital	Capital maintenance	Operations	Capital	Capital maintenance	Operations
Kenya	271293.9	74709.38	33370.1895	16504.12	4501.124	53501.72906	2164.876	590.4208	13919.94266	8137.759	2770.216	13204.69536	175595.9	47889.79	22146.14698
Kenya	271293.9	74709.38	33370.1895	16504.12	4501.124	53501.72906	2164.876	590.4208	13919.94266	8137.759	2770.216	13204.69536	175595.9	47889.79	22146.14698

... SDG COSTING SUMMARY REPORT ($) | SDG COSTING SUMMARY REPORT (LC) | SOURCE | CALCULATIONS

The remaining values in table 1a. are calculated in a similar manner. The estimation of Total Population to be served with New Services is calculated as a homogeneous increment that results from dividing the total expected population to be served by 15 *i.e. the number of years between 2016 and 2030).

The main recommendation is to update the data in the Data Verification Sheet and analyze the outputs in the SDG Costing Summary Report and not to explore the hidden worksheets, given that the amount of information and the complexity of the formulas represent a risk to introduce an error.

Using the tool for sub-national level

If the cost tool is to be applied at the sub-national level, the population numbers for the sub-national level (by rural/urban) will have to be adjusted in the hidden sheet. It is advised to approach SWA secretariat to seek support on this.

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