Monitoring "Affordability" of water and sanitation services after 2015: Review of global indicator options

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Summary

Introduction

The human right to water and sanitation was explicitly recognised through resolution 64/292 by the United Nations General Assembly in July 2010. The normative content of the rights to water and sanitation is to be determined in terms of the criteria of availability, quality, acceptability, accessibility and affordability. One year after the right was adopted, the Human Rights Council guides Member States on their duties with respect to implementing the human right, in Resolution 18/1. One recommendation was that indicators are set based on human rights criteria to monitor progress and to identify shortcomings to be rectified and challenges to be met. General Comment 15 requests that States parties adopt the necessary measures to ensure, among other things, that water is affordable.

Led by the WHO / UNICEF Joint Monitoring Programme, the process is under way to identify targets and indicators for global sector monitoring after 2015. The human rights criteria play a central role in this process of indicator identification. Affordability considerations are key to scaling up water, sanitation and hygiene (WSH) services and ensuring everyone can benefit, irrespective of income or race, from this essential service. Indeed, WSH affordability has been recognised for decades in various global and regional water declarations and statements, and was considered for adoption in the wording of the MDG target 7 relating to water and sanitation access. Many national laws support 'equitable', 'fair', 'acceptable', 'accessible', 'affordable' or 'reasonably priced' drinking water.

Paper aims and methods

The paper aim is to review the concepts and evidence on the affordability of water and sanitation services, from a human rights perspective, and make recommendations on appropriate global indicator(s) for monitoring affordability. Indicator options are evaluated for four key criteria: validity; relevance and likely uptake; data requirements and availability; and resource needs for global monitoring.

The paper draws on published literature on the affordability of water and sanitation services, human rights indicators, and water and sanitation indicators. It reviews potential data sources for the proposed affordability indicators, including national surveys that could support global monitoring. Telephone interviews were held with selected experts.

Affordability indicators assessed

In a first stage of the present study, a long list of indicators was proposed and evaluated according to relevance, robustness and data availability for global monitoring[1]. This analysis was presented in a preliminary report to the client

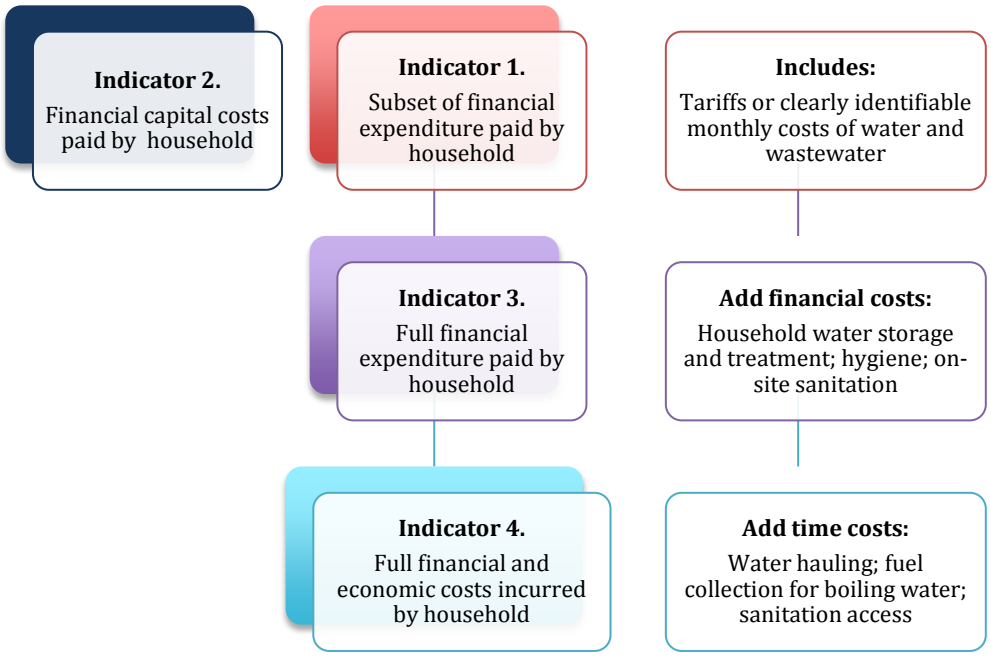
[1] Indicators that were reviewed but not considered appropriate for global monitoring were: perceived affordability of water and sanitation; the unit prices of water and sanitation services; the full societal costs (including subsidies) of WSH services as a proportion of household income; the costs of minimum WSH services to meet the human right; demand elasticities (how much demand changes due to change in WSH prices or of household income); and a number of process indicators focusing on measures to make WSH services more affordable.

and peer reviewers, which led to the selection of four indicator options as the main candidates for global monitoring. The following four indicator are presented and further evaluated in this report:

1. Indicator option 1 (IO.1) compares the annual household water and sanitation expenditure with total annual income. This indicator has so far dominated the assessment of affordability in many countries. As the scope of WSH expenditure normally captured from national household surveys is limited in this indicator, it is termed 'subset' of WSH expenditure.
   = Subset of WSH expenditure ÷ Total annual income
2. Indicator option 2 (IO.2) focuses on whether a household can afford the one-off cash expenditure on capital hardware.
   = Capital WSH expenditure ÷ Total annual income
3. Indicator option 3 (IO.3) broadens the range of WSH financial expenditure to include WSH expenses not usually captured in IO.1.
   = Full WSH expenditure ÷ Total annual income
4. Indicator option 4 (IO.4) further broadens the range of costs captured in IO.3 to include non-financial (economic) costs.
   = Full financial and economic WSH costs ÷ Total annual income

If income data are unavailable or unreliable to be used as the denominator in these four indicators, total annual household *expenditure* can be used as a proxy for income. Figure A shows the relationship between the indicators.

Figure A. Relationship and differences between candidate indicators



Evaluation of affordability indicators

The four indicator options were evaluated according to four criteria: validity, relevance, global coverage of data sets and resources required for monitoring. Validity includes *content* validity (comprehensiveness), *estimation* validity (methodological approach) and *accuracy* (reliability of data sources). Relevance

includes whether the indicators would have uptake by the sector stakeholders and by politicians. A summary of the assessment is presented in Table A.

The main advantage of indicator IO.1 (subset of financial cost) is that it is the most easy to tabulate from existing data sources; it is easy to understand and as it has been previously used in many countries; and it is probably the most politically acceptable. For these reasons, it would be the easiest of the four indicator options to gather support for acceptance as the global affordability indicator. However, this indicator is incomplete as several components of WSH costs are omitted from the WSH questions typically included in expenditure surveys. This omission is most likely to lead to an underestimate the WSH costs of non-networked services, which the majority of poor and vulnerable households use.

Table A. Summary evaluation of candidate indicators

Indicator	Advantages	Disadvantages
IO.1: Sub-set of financial WSH household expenditure as proportion of income or total expenditure	• Until now, has been the dominant affordability indicator used, is easy to understand and has most acceptance • Measurable from survey data that are available from a majority of countries • Measurable from single income and expenditure survey • Mainly compilation of data from household surveys	• Excludes some key financial recurrent costs (household water treatment, non-networked sanitation, hygiene) • Excludes non-financial costs, especially access time costs • Depending on tariff policy of networked service provider, this indicator may exclude capital cost element of WSH services
IO.2: Capital WSS expenditure as proportion of income or total expenditure	• Indicates affordability of the upfront investment cost, which is one major barrier to improving WSS services • Is easy to understand • Data available from research studies, or standard prices (e.g. connection fee) • Upfront household-financed investment costs can be collected for most countries, and can focus on specific groups	• Only refers to investment costs which do not occur frequently • Confusion may arise as investment costs differ between type of facility chosen by household • Data are generally not available from household surveys, and further research needed to compute typical investment costs
IO.3: Full financial WSH household expenditure as proportion of income or total expenditure	• Reflects overall financial costs • Is easy to understand • Measurable from available data sources • Required surveys have been conducted in most countries • Mainly compilation of data from household surveys	• Excludes some key non-financial costs, especially access time costs • Data from different surveys must be combined – such as expenditure surveys and DHS
IO.4: Full economic household costs of WSH as proportion of income or total expenditure	• Reflects overall economic costs to household, including access time costs which is a barrier for many poor households • It is an all-encompassing measure of 'true' affordability for households • Most inputs available from existing data sources • Required surveys have been conducted in most countries	• Economic costs are not so easy to understand and pursue as policy target • Modeling and assumptions introduces uncertainties • Data from other research studies or assumptions needed for some cost components • Value of time spent accessing services is difficult to get broad agreement on • Data from different surveys must be combined – such as expenditure surveys and DHS

Indicator IO.3 (full financial cost) provides a more complete representation of financial costs by adding some expenditure items that are usually excluded from questions in expenditure surveys on water and wastewater service costs. Importantly, it is a more complete cost measure for non-networked services or those with irregular billing and payments. Thus for poorer and more marginalized populations, WSH expenditure captured in IO.3 is expected to be significantly greater than in IO.1. However, an accurate estimation of these additional costs requires other types of national survey or research study that collect information on household water treatment practices, on-site sanitation costs and hygiene costs. The measurement of this indicator needs further compilation, cross-tabulations and analysis of data. While indicator IO.3 is more complete than IO.1, it still lacks non-financial access costs.

Indicator IO.4 (full financial and economic cost) is the most comprehensive indicator. It captures the access time of poor and vulnerable groups to access distant WSH services. It builds on data collected in IO.1, IO.2 and IO.3, and hence for those components it has the same strengths and weaknesses as these indicators. However, indicator IO.4 is the least practical indicator given the additional research methodologies and additional data collection and compilation efforts required to capture time costs. Given the complexities of valuing the time to access services, it is more likely to meet with resistance both at political level, as well as amongst sector specialists.

Indicator IO.2 (capital cost) can serve to increase the validity of the other three affordability indicators evaluated in this paper, by providing a perspective on the affordability of the initial investment. The capital costs pose a major barrier to many households, especially poor and vulnerable households who are the primary focus of the affordability assessment. Given that it excludes recurrent costs, it does not have sufficient validity to reflect WSH affordability on its own. It can therefore be an additional indicator to IO.1, IO.3 or IO.4.

Indicator disaggregation

If the data source allows it, it is proposed that the selected global indicator(s) are tabulated separately for water, sanitation and hygiene. By examining the costs of each service, the analyst and decision maker are made more aware of where the main costs are, and the required focus of response measures to make services more affordable. However, it is proposed that a single affordability threshold is defined for *aggregate* costs (i.e. water, sanitation and hygiene together).

In addition, it is proposed to consider presentation of the affordability indicators for the following populations, according to availability from the national survey data used: entire population; by level of service according to a simple classification (e.g. on-plot versus off-plot); by income or wealth quintile; for median income households; for 'poor' households; by employment status; by head of household; by ethnic group; by special categories (households with someone living with a disability, or someone living with HIV); and by sub-national administrative levels.

The relevance of each disaggregation will vary by country. For global monitoring, measurement of the indicator for poor households or the bottom income or wealth quintile will probably be of widest appeal.

Data sources

A key consideration for the selection of the affordability indicator(s) for global monitoring is that the data are available from routine sources for a majority of countries. For the indicator options with more components (i.e. IO.3 and IO.4), it is important that the measures can be pieced together from other data sources, and using acceptable methodologies. Table B presents the 12 numerator variables (N1 to N12) and 2 denominator variables (D1 and D2), showing which of these are required to measure for each of the four indicators, and showing further which are the main data sources per variable. The table shows how indicator IO.3 builds on IO.1 and IO.2, and how indicator IO.4 builds on IO.3 (refer to Figure A). It also shows clearly how indicators IO.3 and IO.4. draw heavily on other available research, utility data and additional research carried out specifically for global monitoring.

Table B. Variables required to measure indicators, and main data sources

Code	Variable	Indicators				Data sources				
		IO.1	IO.2	IO.3	IO.4	Surveys		Available research	Utilities & providers	Additional research[1]
						IES	Other			
D1.	Household income	√	√	√	√	√				
D2.	Household total expenditure	√	√	√	√	√				
N1.	Water access expenditure	√		√	√	√				
N2.	Sanitation or wastewater expenditure	√		√	√	√				
N3.	Water capital expenditure		√	√[2]	√	(√)		√	√	√
	Duration of hardware			√[2]	√			√	√	√
N4.	Sanitation capital expenditure		√	√[2]	√	(√)		√	√	√
	Duration of hardware			√[2]	√			√	√	√
N5.	Hygiene capital expenditure		√	√[2]	√			√	√	√
	Duration of hardware			√[2]	√			√	√	√
N6.	Household water treatment			√	√		√	√		
	Unit costs of treatment			√	√			√		√
N7.	Other sanitation recurrent expenditure			√	√			√	√	√
N8.	Hygiene recurrent expenditure			√	√			√		√
N9.	Water collection time				√		√	√		
N10.	Fuel collection time				√		√	√		
	Percent of fuel for water treatment				√			√		√
N11.	Sanitation access time				√			√		√
N12.	Economic value of time				√			√		√

√ - affirmative in most or all cases; (√) – affirmative in few or some cases; 'IES' - refers to surveys that collect detailed information on income and expenditure; 'other' – refers to other surveys such as DHS, MICS, CWIQ. [1]Additional research – conducted for the purposes of global monitoring. [2]Note that numerator variables N3, N4 and N5 are only required for indicators IO.3 and IO.4 if the pricing of services paid by households excludes capital costs. If capital costs are indeed excluded, the duration of capital items is required to estimate annual equivalent costs.

Conclusion

This paper has examined the strengths and weaknesses of four major options for an affordability indicator for global monitoring. It was found that no indicator is perfect; each one performs differently against the criteria of validity, relevance, global coverage of reliable data sources, and resources required for global monitoring. The most comprehensive indicator is IO.4, which includes non-monetary access time costs as well as full financial costs. It is therefore considered as the indicator that best reflects affordability. It was also noted that this indicator is also the most challenging and costly to piece together using economic methodologies, data and assumptions from a range of sources. However, indicator options that only capture financial cost will not fully reflect the affordability of WSH services for poor people, whose main cost to access services is time and not money. As affordability monitoring is most important for poor and marginalized populations, the most comprehensive affordability indicator will be important – even necessary – in order to make the exercise worthwhile, and sensitive to the needs of these vulnerable households.

Therefore, if consensus starts emerging that affordability is one of the key criteria for global monitoring, the case will have to be made for raising the additional resources for measuring a comprehensive affordability indicator. If consensus is not found, and resources for post-2015 global monitoring are expected to be limited, then an indicator that captures only financial expenditures could be supported.

All four affordability indicators are calculated as a ratio: WSH costs as a proportion of overall income or expenditure. The purpose of such a ratio is to enable comparison of WSH costs with a defined value, or 'threshold'. If costs are above the threshold, then it signals that WSH costs are becoming *unaffordable*. However, thresholds vary considerably across countries and across international organisations, from as low as 2% to as high as 6%. To be effective, a single value rather than a range is required at global level to judge the affordability of WSH services. The key question is "what value will this threshold take?" It is clearly a political question, because to be meaningful, some form of policy response is needed to reduce WSH costs for certain population groups. Further consultation is needed to define how a global threshold is to be determined.

To strengthen the case for an affordability indicator, it is proposed that a pilot test is conducted in a small sample of countries, to assess exactly which additional components of WSH costs can be captured – how accurately, how easily and at what cost. The countries should be selected to enable further exploration of different issues that arise around measuring affordability. It is expected that these pilot studies will further support the case for the adoption of an affordability indicator in post-2015 global sector monitoring.

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Abbreviations

CWIQ	Core welfare indicators questionnaire
DHS	Demographic and Health Survey
GLAAS	Global Level Assessment and Analysis Survey
HR	Human right
IBNET	International Benchmarking Network for Water and Sanitation Utilities
IES	Income and Expenditure Survey
JMP	Joint Monitoring Programme
LSMS	Living Standards Measurement Survey
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
OECD	Organisation for Economic Cooperation and Development
SEMS	Socio-Economic Monitoring Survey
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WSH	Water, sanitation and hygiene
WSS	Water supply and sanitation

Contents

1. Introduction

1.1 Context

The human right to water and sanitation was explicitly recognised through resolution 64/292 by the United Nations General Assembly in July 2010. The Resolution was backed by several other Resolutions and General Comments, such as the Committee on Economic, Social and Cultural Rights which described the content of the right to water in its General Comment 15,[2] and the Special Rapporteur, in her report on human rights obligations related to sanitation[3]. The normative content of the right to water and sanitation can be determined in terms of the criteria of availability, quality, acceptability, accessibility and affordability[4]. The notion of progressive realization relates not only to progressively achieving universal access to water and sanitation, but also to meeting these standards.

Affordability explained by the Special Rapporteur [1]:

> In too many places, the poorest pay the most for water and sanitation services. Not being connected to the public network for water and sanitation services, people living in poverty sometimes have no other choice than to buy water from informal private vendors, who can charge 10 to 20 times more than public utilities, increasing in times of water scarcity.[1] Even if connected to networked services, these might still be unaffordable to people. Since water and sanitation are so basic for survival, people may spend the extra money to acquire access, but often this comes at the expense of the enjoyment of other human rights. The high price of safe water also pushes people to use cheaper or freely available water that is not safe. The affordability criterion addresses these problems.
>
> Use of sanitation and water facilities and services must be available at a price that is affordable to all people. This includes construction, maintenance of facilities, treatment of water and disposal of faecal matter. Paying for these services must not limit people's capacity to acquire other basic goods and services guaranteed by human rights, such as food, housing, health services, and education. Affordability does not necessarily require services to be provided free of charge. However, when people are unable, for reasons beyond their control, to access sanitation or water through their own means, the State is obliged to find solutions for ensuring their access to water and sanitation.

One year after the right was recognised, and following up on a report by the Special Rapporteur on National Planning for the realisation of the human rights to water and sanitation, the Human Rights Council guides Member States on their duties with respect to the implementation of the human right to water and sanitation, in Resolution 18/1[5]. This includes, among others, continuous monitoring and regular analysis of the status of the realization of the right to safe

[2] Committee on Economic, Social and Cultural Rights (CESCR), General Comment No. 15 (2002): The Right to Water (Arts. 11 and 12 of the Covenant), UN Doc. E/C.12/2002/11.

[3] Report of the independent expert on the issue of human rights obligations related to access to safe drinking water and sanitation, Catarina de Albuquerque, to the Human Rights Council (Sanitation Report 2009), UN Doc. A/HRC/12/24.

[4] United Nations General Assembly. Human rights obligations related to access to safe drinking water and sanitation. Note by the Secretary-General. A/65/254. 6 August 2010.

[5] Human Rights Council. The human right to safe drinking water and sanitation. Eighteenth session, agenda item 3. 23rd September 2011.

drinking water and sanitation, including affordability. This requires targets and indicators to be set on affordability to monitor progress, to identify shortcomings to be rectified and challenges to be met. General Comment 15 mentions that to ensure that water is affordable, States parties must adopt the necessary measures that may include, inter alia: (a) use of a range of appropriate low-cost techniques and technologies; (b) appropriate pricing policies such as free or low-cost water; and (c) income supplements.[6]

Now that the human right has been reaffirmed, it needs to infiltrate into sector decision-making mechanisms, as requested in the guidance to Member States. This includes target/indicator selection and monitoring. There already exists an established drinking water and sanitation global monitoring system – the WHO/UNICEF Joint Monitoring Programme (JMP). Currently, the central focus of the JMP is the monitoring selected service categories of drinking water and sanitation: improved versus unimproved [2]. One further sub-classification each is regularly reported: shared facilities for sanitation, and piped water to plot for water supply.

In May 2011 a stakeholder consultation was hosted by WHO and UNICEF, to discuss what drinking water and sanitation monitoring will look like after 2015 – and to establish a roadmap to review and agree the goal(s), targets, indicators and data sources for future sector monitoring. As of the end of 2011, four working groups have been set up (water, sanitation, hygiene and non-discrimination/equity). The non-discrimination and equity working group is being led by the UN Special Rapporteur on the Human Rights to Water and Sanitation; furthermore, a representative from the human rights community will be a member of the other three working groups. Hence, there exist significant opportunities for the human rights criteria to be well reflected in the discussions of the working groups. This is a good opportunity to influence the monitoring agenda – and to ensure the human rights normative criteria are reflected comprehensively in the selection of targets and indicators for the future sector monitoring [3].

1.2 What is 'affordability'?

The General Comment does not provide any quantitative metric in determining what is affordable. The Committee does, however, state that

> *"Any payment for water services has to be based on the principle of equity, ensuring that these services, whether privately or publicly provided, are affordable for all, including socially disadvantaged groups. Equity demands that poorer households should not be disproportionately burdened with water expenses as compared to richer households." (para 27)*

Affordability has been variously described and measured. In essence, 'affordable' is a relative term, and in general refers to how much a good or service costs in relation to available spending power. At the root is the desire to ensure that:

1. The price faced by consumers does not strongly affect the quantity demanded such that households would choose not to consume the

[6] *General Comment 15, The right to water* (Twenty-ninth session, 2002), U.N. Doc. E/C.12/2002/11 (2003). paras. 26-27.

service, or to demand below the minimum recommended quantity of the service, without another mechanism in place for guaranteeing lower cost access to the service for certain deserving groups; and/or

2. The price paid does not place the household into debt or lead it to reduce consumption of other essential services, such as minimum levels of nutrition, health care, or education for children.

In simple terms, the twin concerns of 'unaffordable' water, sanitation and hygiene (WSH) services is that households will either pay too much for them and hence reduce other essential expenditure, or it will cut back its WSH consumption, with other negative consequences (e.g. adverse health outcomes). Given that some forms of WSH service need organisation, the behaviour of households (e.g. their willingness to support networked solutions) can affect the level of service enjoyed (and demanded) by others.

These concerns point to multiple dimensions of the affordability criterion. Hence, it will be difficult to measure affordability with any degree of precision unless multiple indicators are used. However, real-world constraints on data collection often require simplified – and sometimes single – indicators to be selected.

In a recent review on the topic, Smets proposes that economic affordability be described by an 'affordability index' comparing the monthly water and sanitation bill of a household to its disposable income [4]. As pointed out by Smets, this definition of affordability is in line with the United Nations Centre for Economic and Social, Economic and Cultural Rights' (CESCR) statement in General Comment No. 4 on the Right to Adequate Housing: "Steps should be taken by States parties to ensure that the percentage of housing-related costs is, in general, commensurate with income levels".[7]

The European Commission in both its Green and White books on services of general interest[8] expressed itself in favour of a definition of affordability based on the cost of services and the disposable income of the household.

An OECD report for Egypt defined an affordable WSS tariff as a tariff that allows a "normal household" to pay for the consumption of a "basic amount of water and sanitation services" without the WSS bill exceeding a pre-determined share of the household's income [5]. Therefore, the water and sanitation services are affordable if the combined monthly water and sanitation expenditure of the average household divided by the monthly disposable income of the average household is less than the defined threshold (per cent). The components of this definition are critically assessed in section 3.1.

Real world practice, mainly from developed countries, also focuses on comparing expenditure with household income. For example, in Portugal the water and wastewater bill should never be more than 2 per cent of income (consuming 120 m^3 per family per year or the equivalent of roughly 120 litres per capita per day).

[7] Committee on Economic, Social and Cultural Rights, *General Comment 4, The right to adequate housing*, (Sixth session, 1991), U.N. Doc. E/1992/23, annex III at 114 (1991), para. 8c.
[8] Livre vert sur les services d'intérêt général, COM (2003)270 Final, Livre blanc sur les services d'intérêt général, COM(2004)374.

Hence, 'ability' to pay is judged as a given percentage of disposable or total income (or total expenditure) spent on water and sanitation services. The actual percentage selected varies from country-to-country, and between organizations (see 2.2).

On a review on the subject, Smets states, "By and large State practice supports the choice of an affordability index of 3 to 4 per cent of disposable income of poor households in industrialised countries." (page 1). A number of developing States have adopted policies to promote an affordability index for poor households of 3 to 5 per cent and implement measures to reduce the burden of water expenses for people living in poverty. Citing the examples of France and Mexico, Smets argues that while spending on WSH services of poor households is generally below that of richer households, the burden of these expenses on poorer households is usually disproportionally higher if expressed as a proportion of household budget.

Smets makes the following observations about developing regions. In *Latin America*, most countries have affordability indices above 4 per cent for median households. Because of social tariffs, the affordability ratio for poor households does not exceed 10 per cent and would generally be around 6 per cent for the first decile of income. This would show that many governments in that region consider that an affordability ratio for poor households of 6 per cent is acceptable. In *Africa*, the affordability index for median households is around 2.8 per cent and for poor households connected to public water supply it can easily reach 7.5 per cent. Much higher values of the index have been observed in slums with water supplied by water vendors. In Morocco, the target ratio of 3 per cent for water supply and sanitation of poor households is considered appropriate, and in slums, the ratio is 5 per cent.

Table 1. Unaffordability limits for water or implementation of aid systems

Country	Benchmark	Type of disposable income
Water and sanitation		
Lithuania	2%	Individual household
Northern Ireland	3%	Individual household
Venezuela	4%	Median household
Chile	5%	Individual household
France	3%	Individual household
Kenya	5%	Individual household
Mongolia	6%	Individual household
Water only		
Argentina	3%	Individual household
United States	2%	Median household
Venezuela	3%	Minimum salary
Indonesia	4%	Minimum provincial salary
Mongolia	4%	Individual household

Source: Smets [4]

International agencies have set their own affordability thresholds:

- UNDP: 3 per cent affordability limit [6]
- World Bank: the Africa Infrastructure Country Diagnostic, a World Bank project, cites 5 per cent as a widely used affordability threshold for expenditure on utility services (power and water) [7].
- OECD: 4 per cent (unofficial) [4]
- African Development Bank: 5 per cent [4]

Examples from different parts of the world are provided by Smets on the Protocols that guide groups of countries (e.g. Protocol of San Salvador, European Protocol on Water and Health) and national laws at the country level. For example, Smets finds over 20 examples from LAC and Africa. However, there are few if any examples of application of the law.

1.3 Why 'affordability'?

The pursuit of drinking water and sanitation goals without considering who will pay, and the resulting distribution of the cost burden, will lead to failed policies as well as increased inequality in society. If people are forced to pay more for water and sanitation services than they can afford, it will lead to inequitable financing of the services; or if people opt out of paying for those services, it will lead to inequitable access to those services and they will bear the socio-economic and health impacts associated with lack of access[9]. Furthermore, countries will not reach the targets they have set themselves, and thereby miss the opportunity of improving the quality of life and economic wellbeing of their populations.

Affordable water and sanitation has been recognized in international policy for two decades, since the 1992 Dublin Statement on Water and Sustainable Development[10] and the March 2000 Ministerial Declaration of The Hague on Water Security in the 21st Century (Second World Water Forum)[11]. One leading exponent of the water and sanitation affordability issue, Smets, cites examples of regional treatises on water and sanitation provision that include mention of equity and affordability goals, as well as over twenty examples of national laws on the 'equitable', 'fair', 'acceptable', 'accessible', 'affordable' or 'reasonable' price of drinking water.

For the current international development framework of the Millennium Development Goals (MDG), the affordability criterion was given serious consideration in the definition of the water supply and sanitation target in MDG 7. The process of target finalization reflects considerable indecision whether the affordability criterion should be included in the MDG target[12] [8].

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[9] For example, the World Bank's Water and Sanitation Program has evaluated the costs of inadequate access to sanitation services in Southeast Asia, Asia and Africa. See www.wsp.org

[10] "It is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price."

[11] "Every person has access to enough safe water at an affordable cost to lead a healthy and productive life."

[12] From the Millennium Summit in 2000 came the proposed indicator: "To halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water." Note that, at this stage, sanitation was not yet part of the target. In the Summit follow up in 2001, the wording was switched to 'without sustainable access to…'. In 2002, at the WSSD in Johannesburg, the word 'afford' had found its way back into the wording, and, sanitation was also included. In

It is understood that affordability was excluded from the wording of the MDG target for water supply and sanitation due to to the lack of data sources for global monitoring. Jan Vandervoortmle justified the exclusion of affordability on the basis that it could not be measured: "In an age where numbers prevail, it was decided that only those targets with agreed indicators and with robust data were to be included - but not without making some exceptions. This is why the quality of education, the affordability of water, good governance and human rights (i.e. civil and political rights) and several other areas covered in the Millennium Declaration were not included in the MDGs" [9]. However, at the time (before 2005), no comprehensive review had been conducted on how the affordability criterion could be measured. Hence, this present paper – supported by other recent contributions in the field such as the review by Smets [4] – attempts to fill that gap.

While the cost of water and sanitation service is recognized as a barrier to essential services by all parties on the political spectrum, it is not so widely recognized outside the sector that investing in water and sanitation services leads to significantly improved welfare for the individuals and society as a whole. By consuming the services, people get back much more than the costs – for example, there are multiple health, productive and social benefits [10]. There are also concerns that unaffordable water will reduce the quantity used for other purposes, such as hygiene and sanitation – as expensive or distant water sources will affect the water quantity demanded or collected. The implications for menstrual hygiene are particularly important to note as the largely unexplored aspect of inadequate water access. It is therefore essential to solve the financing issues for all segments of society to enjoy the untapped benefits of improved water and sanitation services.

There is a further entry point for the affordability issue. In many countries, water and sanitation services are not provided efficiently. Inefficient service provision leads to higher costs to the population, either directly (through higher tariffs) or indirectly (through government taxes or diversion of donor support to inefficient services). This raises questions over whether scarce government subsidies should be used for the provision of inefficient services, and how to introduce more price discipline into service provision. However, a simple comparison of the price of services between different locations is not sufficient to conclude how efficiently a service has been provided. There are many factors explaining the cost of services, such as climatic and geo-physical factors, as well as population density and the costs of production (e.g. cost of staff, costs of import of equipment). As well as these, there are also less 'acceptable' reasons why costs may be unaffordable to some population groups, such as corruption and avoidable inefficiency, which unnecessarily increase the costs of a service. Hence, it needs to be determined what factors are underlying the observed cost of services.

2004 the word 'afford' was out of the wording again, in 2005 it was back in again. In the final decisions in 2006 (UN GA) it was out again. The final target read: "Halve, by the year 2015, the proportion of population without sustainable access to an improved drinking water source and improved sanitation, urban and rural". Source: Bartram, 2011.

1.4 Review of household spending on WSH services in countries

In his recent global analysis, Smets compares the expenditure on water and sanitation services as a proportion of disposable income of a household with median income versus a household with 40 per cent of the median income, defined as 'poor' households [4]. In *industrialised countries*, households with an income equal to the median disposable income generally spend around 1.1 per cent of their income on water and sanitation, with a range from 0.7 per cent to 1.7 per cent. Poor households spend on average approximately 2.6 per cent. This can be higher when people are very poor, or in municipalities where water is particularly expensive. In *transitional and developing countries*, median households often spend 2.5 per cent of their income on water, i.e., over twice what is common in industrialised countries. Consequently the affordability ratio of poor households is at least two times larger (6 per cent for transitional countries in the EU and Latin American countries, to 7 per cent in African countries) because of the low income of very poor households [11]. Smets finds that for eleven 'transition' countries in eastern Europe, the Caucasus and Central Asia, examination of the data shows that there are probably two groups of countries: those with high water subsidies and low water prices (affordability ratio for median households near 1 per cent) and those with reduced subsidies and higher water prices (affordability ratio of median households nearing 3.5 per cent).

Table 2 shows examples of countries with low income populations spending a high proportion of income on water and sanitation services, taken from Smets [4]. In addition to these, data gathered from Egypt show that 11 per cent of households spent over 1 per cent of income on water and sanitation (among the higher income groups) and the average across Egypt is around 0.8 per cent [5].

Available materials reporting on affordability of WSH services does not always specify exactly what expenditure categories are included. In urban areas, it is likely to be the water and sewerage bills combined. However, in countries without combined services, and those settings (especially rural settings) where sewerage is not provided, it is relevant to question whether the costs of sanitation are fully included. While in most countries, the highest proportions of water and sanitation expenditure to income are in the range of 11 per cent for the lower income groups, in Burkina Faso the lower quintile (i.e. poorest 20 per cent) are estimated to spend 29 per cent of their income on WSH services.

Table 2. Examples of countries with low-income populations spending a high proportion of income on water and sanitation services

Country	Statistic
Argentina	Lower quintile spends more than 11% of income
Armenia	12.3% of households spend more than 5% of income
Burkina Faso	Lower quintile spends more than 29% of income
Chile	Two lower quintiles in Valparaiso spend over 5% of income, on average
Colombia	Lower decile spends more than 9% of income
Ecuador	Lower quintile spends more than 9% of income
El Salvador	Lower quintile spends more than 11% of income
France	1% of households spend more than 4.8% of income
Hungary	Lower quintile spends more than 5.3% of income
Jamaica	Lower quintile spends more than 11% of income
Latvia	Lower quintile spends more than 5.1% of income Poor households spend over 6.3% of income
Poland	Poor households (<50% of median income) spend over 10.8% of income
Romania	Lower quintile spends more than 5.7% of income Poor households spend over 8.1% of income
Russia	Lower decile spends more than 6% of income
Surinam and Bolivia	Lower quintile spends more than 8% of income
Ukraine	6.4% of households spend more than 6% of income
United Kingdom	2% of households spend more than 8% of income
Uruguay	Lower quintile spends more than 10.4% of income

Source: cited from [4], original source [11]

1.5 Scope and definitions

In the human right to water and sanitation, **water supply** is for personal and domestic uses, but not agricultural, commercial or industrial uses. General Comment No. 15, the UN Committee on Economic, Social and Cultural Rights ('UN CESCR') stated that the human right to water entitles all individuals to "sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses".[13] This includes household water treatment when the water source is not reliable enough.

In conformity with the normative content of the human right to water and sanitation, **sanitation** should be safe, hygienic, secure, socially and culturally acceptable, provides privacy and ensures dignity. It should be available in all spheres of life[14]. Practically, this means a safe private nearby toilet consisting of a system for the collection, transport, treatment and disposal or reuse of human

[13] *General Comment 15, The right to water* (Twenty-ninth session, 2002), U.N. Doc. E/C.12/2002/11 (2003), para. 2.

[14] Including, inter alia, the home, public buildings and places, the workplace, schools, hospitals, refugee and IDP camps, prisons and detention centres.

excreta and associated hygiene practices. Domestic wastewater management, which flows from toilets, sinks and showers, is included in this description of sanitation insofar as water regularly contains human excreta and the by-products of the associated hygiene practices. In settings where one toilet per household is not financially feasible in the short term, or not technically feasible due to space constraints, then shared or public facilities are considered acceptable. These should be low cost and hygienic. However, in the spirit of 'progressive realisation', shared facilities are not considered the final 'resting point', and hence one toilet per household should be the ultimate goal of sanitation policies.

Human rights do not settle for minimum standards, however, such as basic access to water and sanitation. Ultimately they require the achievement of a higher standard that guarantees an adequate standard of living. For example, basic sanitation such as pit latrines provides some protection to health and the environment, but greater protection can be provided with more advanced facilities that include complete isolation and/or treatment of human excreta. Indeed, some forms of basic sanitation – such as pour flush to a drainage system that empties untreated wastewater into water resources – can present greater challenges to health than would other forms of unimproved sanitation, if populations are in contact with those water resources.

Central to the human right to water and sanitation is non-discrimination. States are obliged to pay special attention to groups particularly vulnerable to exclusion and discrimination in relation to sanitation, including people living in poverty, sanitation workers, women, children, elderly persons, people with disabilities, people affected by health conditions, refugees and internally displaced populations, and minority groups, among others.

To maintain emphasis on **hygiene** as an essential element of safe provision of water supply and sanitation, this document refers to water, sanitation and hygiene (WSH) services. It also recognises the fact that specific hygiene indicators are being sought for global sector monitoring after 2015. Although hygiene has broad connotations, in this document it specifically refers to hand washing at critical times, such as after defecation and before meal times. A hygienic toilet and hygienic practices in relation to water supply are dealt with under sanitation and water supply, respectively.

1.6 Aim and approach of the paper

The paper **aim** is to review the concepts and evidence on the affordability of water and sanitation services, from a human rights perspective, and make recommendations on appropriate global indicator(s) for monitoring affordability.

The **purpose** of the paper is to inform the Special Rapporteur's contributions to the post-2015 monitoring agenda and a report to be submitted to the General Assembly in October 2012 by the Special Rapporteur.

The **key materials** include:

- Published papers on the affordability of water and sanitation services, human rights indicators, and water and sanitation indicators.

- Potential data sources for proposed affordability indicators, including national surveys that could support global monitoring.
- Interviews and phone conversations with selected experts working in these fields[15]. Comments on the draft report were provided by several other resource people (see Acknowledgements).

The specific **outputs** are recommendations on:

- Proposal for the inclusion of affordability criterion in the water and sanitation goal and targets.
- Potential indicators that could be considered for use at a global level, detailing the alternative specific definition(s) of the indicator(s) and data sources.
- Indicator value or values (benchmark) for defining what is affordable (e.g. a given per cent of household disposable income).
- Areas requiring further research before 2015 in order to arrive at such indicators.

In addition, in considering indicators for global use, there are some indicators that are not appropriate for global monitoring but which could be monitored at country level. Therefore, recommendations are made for such indicators.

The rest of this paper is arranged as follows. Chapter 2 identifies and defines the four indicator options for detailed review, and the data requirements and availability to successfully monitor these indicators at global level. Chapter 3 assesses the strengths and weaknesses of indicator options according to the criteria of validity, relevance/uptake, global coverage of data sources, and resources required for global monitoring. Chapter 4 explores some of the weaknesses of using the proposed indicators for global monitoring of affordability, and proposes other aspects for monitoring to complete the affordability picture.

[15] These include (in alphabetical order): Fred Arnold, Jaime Baptista, Jamie Bartram, David Bradley, Eitan Felner, Paul Hunt, Malcolm Langford, Rolf Luyendijk, Archana Patkar, Ignacio Saiz and Tom Slaymaker. Affiliations are provided in the Acknowledgements section.

2. Alternative indicators of 'affordability'

This chapter presents a long list of candidate affordability indicators for global monitoring which is reduced to a short list for further assessment. The short listed indicators are then defined and assessed for specific data requirements and data availability.

2.1 Indicator proposals

In a first stage of the present study, a long list of indicators was proposed and evaluated according to four criteria for global monitoring. This analysis was presented in a preliminary report to the client and peer reviewers. A summary is provided in Table 3. The four criteria assessed were:

1. Validity: how well does the indicator reflect affordability?
2. Relevance and uptake: is the indicator likely to have good uptake by sector stakeholders as well as at the political level?
3. Data sources: how robust are the currently available data sources? How comprehensive and representative are the available data sets? Can the indicators be monitored in a majority of developing countries?
4. Resources for monitoring: how much effort is required to measure the indicator, in terms of further data collection, data extraction and compilation, and data analysis?

Table 3 shows the summary results of the assessment, measured on a three-point scale for each criterion. For the first three criteria, the score options are 'High', 'Adequate' and 'Low'; while for the fourth criterion, the resources required for monitoring, the score options are 'Significant', 'Moderate' and 'Minimal'.

This assessment led to the selection of four indicator options as the main candidates for global monitoring. These indicators received an assessment of 'Adequate' or 'High' for the first three criteria of validity, relevance/uptake, and global data sources. The indicators that scored 'low' on one or more of these criteria were excluded. This lead to some indicators that scored well on one or two criteria being excluded from further assessment in this present paper. For example, an indicator on "Perceived affordability" is valid with potentially high uptake; but no data sources are currently available. Also, data for an indicator on the "Price of water and sewerage services" are commonly available for networked services, but does not indicate overall affordability, hence it has low validity. For more detailed assessment of all the indicator options, the reader is referred to the separate initial report[16]. These indicators may be of further interest for national monitoring.

[16] Available from author, on request

Table 3. Initial proposal and assessment of indicators for global monitoring

Indicator	Criteria for assessment			
	Validity	**Uptake**	**Data sources**	**Effort**
Selected indicators for further evaluation				
Full financial WSH expenditure as % of household income or total expenditure	High	High	Adequate	Moderate
Subset financial WSH expenditure as % of household income or total expenditure	Adequate	High	High	Minimal
WSH economic costs as % of household income or total expenditure	High	Adequate	Adequate	Significant
Capital expenditure paid by household as % of one year's income or total expenditure	Adequate	Adequate	Adequate	Moderate
Other water and sanitation costs				
Monthly fixed tariff as proportion of total water (and wastewater) bill	Low	Low	Adequate (network)	Moderate
Monthly fixed tariff value for water and wastewater	Low	Low	Adequate (network)	Moderate
Perceived affordability of water and sanitation	Adequate	High	Low	Significant
Water and sanitation 'prices'				
Price per m^3 of piped water and sewerage	Low	Adequate	Adequate (network)	Moderate
Price per 20 litres of non-piped water	Low	Adequate	Low	Moderate
Price of entry to public toilet	Low	Adequate	Low	Moderate
Full societal costs of WSH services				
Full (societal) WSS costs as percentage of household income or total expenditure	Low	Low	Adequate	Significant
Full (societal) capital costs as % of one year's income	Low	Low	Adequate	Significant
Process indicators				
Process ensures needs of poor taken into account in pricing policy & technology choice	Low	Adequate	Low	Moderate
One-time capital loans or subsidies provided to low-income or disadvantaged households	Low	Adequate	Low	Moderate
Flexible, appropriate mechanisms offered to low-income households to pay WSS expenses	Low	Adequate	Low	Moderate
WSS services corruption index	Low	Low	Low	Significant
Proportion of households disconnected from water supply in the past year	Low	Adequate	Low	Moderate
Reconnection fee as % of household income or total expenditure	Low	Adequate	Low	Moderate
WSH costs of minimum services to meet human right				
Hypothetical annual WSH expenditure as % of income or total expenditure	High	Adequate	Low	Significant
Hypothetical capital WSS expenditure as % of annual income or expenditure	Low	Adequate	Low	Significant
Hypothetical WSS prices, compared across jurisdictions and income groups	Low	Adequate	Low	Significant
Demand elasticities				
Price or income elasticity of demand of metered water consumption	Low	Low	Low	Significant

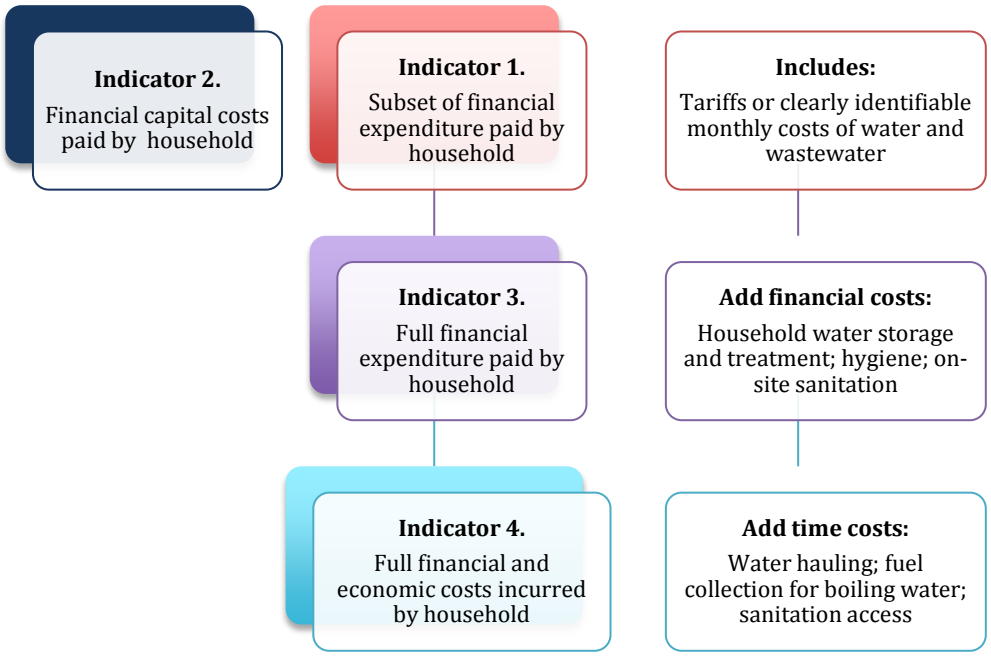
WSH – water, sanitation & hygiene; WSS – water supply & sanitation; Network: networked services

As stated in the Introductory chapter, one indicator has so far dominated the assessment of affordability in countries [4]: the "household water and sanitation expenditure as a proportion of income". This indicator is typically measured for the median and poorer households, and compared with defined affordability thresholds. It includes water and wastewater expenditure that is usually captured in expenditure surveys. Whether it includes capital cost depends on the tariff policy of the service provider. In this study it is labelled 'indicator option 1' (IO.1).

However, there are a number of weaknesses associated with this affordability indicator, which are discussed in this paper[17]. The alternative indicators presented in this Chapter focus on improving the completeness of IO.1:

1. Indicator option 2 (IO.2) focuses on whether a household can afford the one-off cash expenditure on capital hardware.
2. Indicator option 3 (IO.3) broadens the range of WSH financial expenditure to include WSH expenses not usually captured in IO.1.
3. Indicator option 4 (IO.4) further broadens the costs of WSH services to include non-financial (economic) costs.

Figure 1. Relationship and differences between candidate indicators



The relationship between the indicators is presented in Figure 1. Each indicator is described, justified and defined in the following sections. Specific data requirements for each indicator are provided in Chapter 2.2.

2.1.1 Subset of financial WSH expenditure

IO.1: Financial WSH expenditure as percentage of household income or expenditure

The indicator is a ratio: Subset WSH expenditure ÷ Total annual income.

[17] A more detailed of weaknesses is provided in Chapter 3.1 of the initial report.

If income is unavailable or considered too unreliable, total annual household expenditure can be used as a proxy for income.

The financial costs included in this indicator commonly includes expenditures on networked water & wastewater services, and for households using non-networked services, it usually includes regular expenditure on water purchase. On the other hand, the expenditure items collected in expenditure surveys usually exclude on-site sanitation costs (for both networked and non-networked sanitation), household water storage and treatment, and hygiene expenses. The expenditure may include all or some of the capital costs if the tariff policy of service provider is to cover capital costs.

2.1.2 Capital financial WSH expenditure

IO.2: Capital expenditure paid by household as percentage of one year's income or expenditure

The indicator is a ratio: Capital WSH expenditure ÷ Total annual income.

If income is unavailable or considered too unreliable, total annual household expenditure can be used as a proxy for income.

Especially for non-networked WSS services, expenditures are 'lumpy' for many populations. That is, expenses and payments are not regular, and in many cases may be incurred every few years. As for low-income households, a significant proportion of sanitation costs are investments in hardware, and they do not occur every year. Given the investment cost is one of the most important affordability constraints for many households, it is important to propose an indicator based on the investment cost faced by the household.

This indicator includes the financial cost only, and only the cost paid by the household. Subsidies should be excluded. The value excludes the time input of the households into the construction of infrastructure. For a networked service, the cost may be the connection fee. Also, other costs, such as those incurred on the householder's property, should also be included (e.g. the toilet itself, additional pipes and fittings, and the pit or a septic tank). It therefore focuses on what a household is expected to raise in terms of cash contribution.

2.1.3 Full financial WSH expenditure

IO.3: Full financial WSH expenditure as percentage of household income or expenditure

The indicator is a ratio: Full WSH expenditure ÷ Total annual income.

If income is unavailable or considered too unreliable, total annual household expenditure can be used as a proxy for income.

This indicator aims to include all the financial costs of accessing water, sanitation and hygiene services. This includes not only water and wastewater tariffs/charges captured in IO.1, but also financial costs that are commonly not included in expenditure surveys on WSH recurrent costs, such as:

(1) Household water storage and treatment;
(2) Hygiene hardware (sink, shower) and materials such as soap
(3) On-site sanitation such as the toilet / latrine itself, and costs typically paid by the households for conveyance to the boundary of the property.

(4) Other charges paid by the household which cover capital costs (e.g. water or wastewater connection fee) – which may be one-off in nature or monthly or annual.

Many households treat water to make it safe. Especially in the developing world, with imperfect regulation of piped water quality, or imperfect protection of open sources such as wells, this is indeed a necessary measure to ensure water is safe to drink. Even when water is safe to drink, user perceptions may be otherwise, due to previous events such as disease outbreaks that put into question the safety of water supplies. Some populations may also be resistant to accept that piped water is safe to drink, due to a lifetime of treating water in the household.

Water treatment incurs both financial and non-financial costs. Financial costs include purchase of fuel (for boiling method), chemicals (such as chlorine), or purchase and maintenance of water purification systems. Non-financial costs include the time to collect biomass (for boiling method) or the time necessary to boil water or implement other purification methods (e.g. filling bags for solar disinfection). Both financial and non-financial costs impose a burden on the household.

For a networked household asked what they spend on water supply per month, per quarter or per year, it is usual to include a question on the sewerage or wastewater costs. However, these costs will include the tariff charged to the customer, which essentially covers the sewerage network and the wastewater treatment plant (if there is one). In many instances, this tariff may cover operations and maintenance costs. However, it rarely covers the full costs of capital replacement. These costs are commonly paid by governments or donors, and part of these are passed to the consumer in the form of one-off or regular connection fees. The tariff also does not cover the on-site costs of sanitation; in other words, the toilet or latrine itself. Hence, IO.3 intends to capture these financial costs that the household commonly has to pay.

Likewise, for non-networked households, the questions in expenditure surveys do not – or rarely – explicitly cover sanitation costs. This includes not only hardware costs, but also running and maintenance costs, including costs of emptying septic tanks or pits. In expenditure surveys, these would usually be included under building / property costs, but not necessarily identified as sanitation or hygiene-related. Also, questions on expenditure sometimes, but rarely, cover recurrent hygiene costs such as soap. These items tend to be covered in general (non-food) household expenses. However, hygiene costs can be significant. Hence if they can be identified, they should be included in Indicator Option 3.

This indicator is defined above to include recurrent costs. However, it could incorporate Indicator Option 2 by including an element of capital costs. This would make it a more comprehensive indicator. Capital costs would therefore need to be estimated on an annual equivalent basis (i.e. annualized), taking into account the expected duration of life of the facility before major renovation is required, or replacement. Standard lengths of life can be assumed for different types of facility, assuming some basic level of maintenance is assured.

2.1.4 Full financial and economic WSH costs

IO.4: Full financial and economic costs as percentage of household income or expenditure

The indicator is a ratio: Financial & economic WSH costs ÷ Total annual income.

If income is unavailable or considered too unreliable, total annual household expenditure can be used as a proxy for income.

This indicator takes into account the 'hidden' costs of WSH access, not commonly included when measuring WSH financial expenditures. These hidden costs typically include:

(1) Time costs of water access (hauling);
(2) Time costs of fuel collection for household water treatment (boiling);
(3) Time costs of sanitation access.

As already mentioned for IO.3 above, this indicator can also include

(4) Annualized costs of capital expenses paid directly by the household (e.g. connection fee, construction cost). These costs should be added to the financial costs in indicators 1 and 3, when tariffs exclude capital replacement costs.

Many poor households spend significant amounts of time to access (unimproved) water and sanitation facilities. Water collection times and sanitation access times vary between populations, depending on a number of context-specific factors. Many research studies have quantified the access times for water and fuel collection; access time and identity of the water hauler and fuel (biomass) collector are also included in some national surveys (see Chapter 2.3). However, these non-financial costs of time are not included in the estimates of expenditure on WSS services in IO.1, IO.2 or IO.3. Not being valued in monetary terms, these costs are commonly ignored in the affordability debate. Affordability indicators used until now in countries have not included time value, nor even mentioned this issue as potentially relevant. On the other hand, some research has included time costs in water access costs [12, 13].

Households that collect water or spend considerable time finding a safe secluded spot to defecate, or walking to free public toilet facilities, will have zero expenditure for WSS services. This makes the services financially affordable: but are they really affordable? Taking an economic perspective, time should be viewed as a resource: if household members were not spending time accessing water or sanitation, they could be using their time for other productive activities, or alternatively, enjoying more leisure time. The positive value of time to householders has been demonstrated empirically by purchase decisions made by the household – such as paying for vendor-delivered water rather than spending time collecting it themselves [14, 15].

Hence, how can access time be valued? There have been many attempts by economists to value time in the context of WSS services within cost-benefit analyses [16] and other economic research. For example, studies in Africa value the social cost of obtaining water in the Drawers if Water studies in East Africa [12, 17] and the willingness to pay for time savings associated with water supply

and sanitation services by several World Bank studies [14, 15, 18]. It would be necessary to seek consensus on an appropriate value to use, using for example a fixed proportion of the minimum wage or the GDP per capita. The proportion may vary between different population groups, such as between adults and children [13]. This latter is difficult to reflect accurately, and to generalise across populations. Different people and populations will clearly have a different value of time. However, by valuing the time of poor people to access WSS services, it will change the perceived affordability of these services. And by being more explicit about the significant time investments made by the rural poor in accessing WSS services, it will give greater emphasis to the provision of convenient services. It will also change the service level obtained by those populations, given the fact that more water is consumed when water sources are closer, and the multiple benefits this brings to households.

2.1.5 Indicator disaggregations

If the data source allows it, it is proposed that expenditure and cost data are tabulated separately for water, sanitation and hygiene. By examining the costs of each service, the analyst and decision maker are made more aware of where the main costs are, and the focus of response measures to make services more affordable. However, a separation of WSH costs does not imply that a separate affordability threshold is desirable, given the complications raised by defining these separately (see Chapter 3.2.4).

In addition to a water, sanitation and hygiene disaggregation, it is proposed to present the global affordability indicator(s) for the following populations:

- Entire population
- By level of service according to a simple classification (e.g. on-plot versus off-plot service)
- Relative income and wealth measures
    - By income quintile
    - By wealth quintile
    - For median income households
- Absolute income and wealth measures
    - 'Poor' households (international definition of income poverty, national definition of income poverty, or food poor households)
- By employment status
- By head of household together with wealth or income quintile
- By ethnic group
- By special categories (households with someone with a disability, or someone living with HIV)
- By sub-national administrative levels

The relevance of each disaggregation will vary by country. For global monitoring, measurement of the indicator for 'poor' or 'lowest quintile' households will probably be of widest appeal.

2.2 Data requirements for indicators

The next logical step is to build the list of data requirements for the indicators elaborated above, to prepare for the assessment of the alternative data sources

(covered in Chapter 2.3). Indeed, indicators that convincingly capture the essence of affordability may not be able to be measured due to data constraints. Hence, this is an important assessment to carry out before the overall assessment of indicator options in Chapter 3.

Table 4 presents the data requirements for each indicator in turn. Data requirements are labeled according to whether they are for the Numerator (N) or Denominator (D). Overall, there are 12 numerator variables and 2 denominator variables. For some of these variables there will be requirement for disaggregation, depending on which type of disaggregation is selected (see Chapter 2.1.5). Note also that variables N3, N4 and N5 can be included in the expenditure items of IO.3 and IO.4 if capital costs are not included in water and sanitation bills covered in N1 and N2.

Table 4. Data requirements for measurement of indicators

Indicator	Data requirements
IO.1: Subset financial WSH expenditure as percentage of household income or total expenditure	• N1. Water access expenditure • N2. Sanitation or wastewater expenditure • D1. Household annual income, or • D2. Household annual expenditure
IO.2: Capital expenditure paid by household as percentage of one year's income or total expenditure	• N3. Water capital expenditure • N4. Sanitation capital expenditure • N5. Hygiene capital expenditure • D1. Household annual income, or • D2. Household annual expenditure
IO.3: Full financial WSH expenditure as percentage of household income or total expenditure	• N1. Water access expenditure • N2. Sanitation or wastewater expenditure • N3. Water capital expenditure and duration of hardware • N4. Sanitation capital expenditure and duration of hardware • N5. Hygiene capital expenditure and duration of hardware • N6. Household water treatment expenditure • N7. Other sanitation recurrent expenditure • N8. Hygiene recurrent expenditure • D1. Household income, or • D2. Household total expenditure
IO.4: Full financial and economic WSH costs as percentage of household income or total expenditure	• N1. Water access expenditure • N2. Sanitation or wastewater expenditure • N3. Water capital expenditure and duration of hardware • N4. Sanitation capital expenditure and duration of hardware • N5. Hygiene capital expenditure and duration of hardware • N6. Household water treatment expenditure • N7. Other sanitation recurrent expenditure • N8. Hygiene recurrent expenditure • N9. Water collection and treatment time • N10. Fuel collection time • N11. Sanitation access time • N12. Economic value of time • D1. Household income, or • D2. Household total expenditure

2.3 Data sources for monitoring affordability

2.3.1 Overview of data sources

In order to monitor WSH affordability at the global level, four main types of data source are available:

1. Survey data from representative national surveys
2. Available research studies and non-nationally representative surveys
3. Compiled data from utilities, providers and regulators
4. Other data sources that are compiled specifically for the purposes of monitoring affordability

The first of these, **survey data from representative national surveys**, is potentially the most important data source, given the advantages of using surveys that are largely standardized across countries and whose sampling methodology ensures national representation. In addition, the large sample sizes of these surveys usually allow for disaggregation at sub-national level and by population groups. These surveys are catalogued for non-OECD countries by the International Household Survey Network[18] (after 1981), and classified under 18 different categories of survey. For the purposes of this study, nine relevant survey categories are extracted from 1995 to 2011 and presented in Annex A[19]. An overview of these nine survey categories is provided in Table 5.

Table 5. Countries and key data from nationally representative surveys

Survey Instrument	Countries[1]	Data presented on:			
		Poverty status	Quintiles	Water source	Sanitation access
Core welfare indicators questionnaire (CWIQ)	22	Yes	Income	Yes	Yes
Demographic and Health Survey (DHS)	79	No	Wealth[2]	Yes	Yes
Income and Expenditure Surveys (IES)	104	Yes	Income	Yes	Yes
Integrated Surveys (non-LSMS)	79	Yes	Income	Yes	Yes
Living Standards Measurement Survey (LSMS)	31	Yes	Income	Yes	Yes
Multiple Indicator Cluster Survey (MICS)	82	No	Wealth[2]	Yes	Yes
Population and Housing Census (PHC)	173	No	Wealth[2]	Yes	Yes
Priority Surveys (World Bank)	20	Yes	Income	Yes	Yes
Socio-Economic Monitoring Survey (SEMS)	19	Yes	Income	Yes	Yes

Key: [1] Covers mainly countries of the developing world, although some countries belonging to the European MDG region are included (e.g. Croatia, Hungary, Poland). [2] Based largely on durable goods and housing characteristics, and includes source of water and type of sanitation.

[18] http://www.internationalsurveynetwork.org/

[19] Other surveys deemed to be non-relevant are: 1-2-3 surveys, agricultural surveys, labour surveys, the World Health Survey and the World Fertility Survey.

The most widespread survey is the Census (termed 'Population and Housing Census' by the International Survey Network) which has been implemented in 173 countries – thus almost all countries of the developing world. These surveys are usually conducted every 10 years.

Surveys that focus on a broad range of living standards indicators have been conducted in most countries at least once since 1995. These include the core welfare indicators questionnaire (CWIQ), the living standards measurement survey (LSMS), the socio-economic/monitoring surveys, the priority surveys and integrated (non-LSMS) surveys. Non-LSMS and priority surveys are various forms of survey that do not classify as official LSMS, but are often similar in content. The CWIQ survey is a survey that has been conducted mainly in Africa (21 African out of a total of 22 countries);

The Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS) focus mainly on health and population indicators and are conducted almost exclusively in low-middle and low-income countries. These two surveys are conducted in a significant number of countries around the world every 3 to 5 years, although in many countries the period with no survey can be longer. Together, these two surveys have been applied approximately 300 times in 118 countries since 1995.

Income and expenditure surveys cover various types of survey, and include the Household Budget Survey. These have been conducted in 104 countries of developing countries (including countries in transition) since 1995. Many middle-income countries conduct this type of survey every year, and in poorer countries it ranges from every 2 years to 9 years. According to Eurostat, roughly two-thirds of countries of the European Union conduct annual Household Budget Surveys, while the remaining one-third conduct less frequent Household Budget Surveys[20]. According to Eurostat, surveys vary between EU countries in terms of frequency, timing, content and structure[21]. The last fully completed round for all European countries was 2005. Currently data are collected for all 27 EU Member States as well as for Croatia, the Former Yugoslav of Republic of Macedonia, Turkey, Norway and Switzerland.

While the focus of these nine categories of survey shown in Table 5 is different, they usually include similar general characteristics of households that enable comparison over time within the same country, as well as inter-country comparisons. These variables include: characteristics of head of household, household demographics, average household size, age dependency ratio (not all surveys), asset ownership, employment and occupation, food security (not all surveys), and water and sanitation access. The Joint Monitoring Programme has over ten years of experience of extracting data on water and sanitation access from many of these surveys.

The nine survey categories are all nationally representative, and moreover data can be disaggregated and compared across a number of different population sub-groups – such as rural-urban, by the first sub-national administrative level, by ethnic group, by gender, by education level, by income level or income/wealth

[20] http://epp.eurostat.ec.europa.eu/portal/page/portal/household_budget_surveys/introduction
[21] Water supply, refuse collection and sewerage costs are covered in the standard forms HE04.4.

quintile, among others. Data sets with these disaggregations will be very useful in comparing WSH expenditures among population groups that are more likely to face affordability constraints.

One aspect that needs to be further explored with survey and sampling experts is the degree of coverage, and breakdown possible, for populations living in specific low-income neighbourhoods, especially informal settlements and slums. Some governments may not allow surveys to be conducted in some types of housing that are not officially recognized. Furthermore, survey sampling methods usually do not allow data to be disaggregated to specific areas of a single city, for example.

Other types of nationally-representative survey are conducted in countries, but not at the household level. These include public expenditure surveys, business surveys, economic and market surveys, and some types of labour surveys, among others. Given that the focus of the indicator options is on household level spending and affordability, these surveys are not further assessed here.

The second category of data source, **research studies and non-nationally representative surveys**, are likely to be less important for global monitoring. These include UN-Water's Global Level Assessment and Analysis Survey (GLAAS), which consists of a questionnaire to Ministries and donors every 2 years; the WASHCost project which estimates unit costs of services; and various WaterAid studies. Some of these studies cover an important number of countries, especially low-income developing countries. The GLAAS survey, for example, covers approximately 70 countries in the latest round in 2012. A previous review on the subject, conducted by Trémlet for the GLAAS [20], has been drawn on extensively to assess the potential data sources for measuring affordability. However, as these data sources generally focus on public and not household expenditure, and because they are not yet available for a majority of countries, the results are not presented here but are available in the long report and in the original report of Trémolet. However, for national monitoring purposes, these studies may be drawn on to examine affordability in specific parts of the country or specific population groups of interest.

The third category of data source, **compiled data from utilities, providers and regulators**, is likely to be useful for some key variables on service access, prices of services, and expenditure. Regional and global databases and networks can be drawn on to extract useful data. One important global database is the International Benchmarking Network for Water and Sanitation Utilities (IBNET), managed by the Water and Sanitation Program of the World Bank. Data available from IBNET are further explored in Chapter 2.3.2.

The fourth category of data source, **other data sources compiled for the purposes of monitoring affordability**, will be proposed as a result of the gaps found in other data sources to monitor the recommended indicators on affordability.

Each data source is evaluated for:

- **Specification**: what specific information is collected?

- **Disaggregation**: are data presented by level of administration, wealth or income quintile, and other population sub-groups, such as female-headed households, families with young children?
- **National representation**: are survey samples defined to be nationally representative?
- **Frequency**: how often is the survey or data collection conducted?
- **Degree of standardization**: do survey methods, including questionnaire design, stay constant over time in the same country? Are survey questionnaires standardized between countries?

2.3.2 Household WSH expenditure variables (numerator)

Regular national household surveys

Table 6 presents a summary of the types of data available from national household surveys that are relevant for the calculation of WSH financial expenditure and access time costs. These include annual expenditure as well as capital expenditures on new systems or repairs.

The most complete and robust data source on WSH expenditure is the income and expenditure survey (IES). It shoud be noted, however, that there is some variation in the questions included from country to country. In the European Union, the household budget survey captures water supply, refuse collection and sewerage costs (in the standard forms, section HE04.4). Also, over time, surveys tend to become more detailed and specific. Surveys which capture water and wastewater costs alone are integrated surveys, living standards measurement surveys, and SEMS surveys. The CWIQ survey only captures major categories of household spending, hence it is not possible to extract water and sanitation costs. The DHS, MICS, Census and priority surveys do not collect WSH expenditure data.

Expenditure items with very limited data are (1) capital expenditure, which is usually mixed with housing expenditure, if collected at all; and (2) maintenance expenditure, which is usually mixed with general maintenance, if included at all. The fixed part of the water tariffs is not collected by any household surveys.

The surveys best capturing variables to estimate the costs of water treatment or water collection, including the identity of the water hauler, are the MICS, DHS, integrated, LSMS and SEMS surveys. However, there is some variation in the specific questions in each of these surveys. The MICS and DHS are generally more standardised and consistent between countries. Over time, additional questions and specification have been added to both these surveys. Of these five survey types that ask about whether the household treats its drinking water or not, most also ask what is the water treatment method. The capital cost of water treatment methods (e.g. water boiler, filter) is sometimes identified in expenditure surveys.

Table 6. Sources of data on WSH expenditure from nationally-representative surveys

Survey Instrument	Monthly or Annual Expenditure			Other Expenditures			Water Treatment			Water access		
	Water	Sanitation	Hygiene	Fixed tariff	Capital items	House repairs	% house-holds	Treatment method	Capital cost	One trip	Daily trips	Water hauler
CWIQ	Only part of 'Fuel, lighting, other utilities'	No	Only part of "Miscellan-eous" expenses	No	No	No	No	No	No	Time	No	No
DHS	No	No	No	No	No	No	Yes	Yes	Only hardware type	Time	No	Yes
Income & Expenditure Surveys	Sometimes water bill separate, sometimes mixed with housing and utility	Sometimes stated as 'mixed sanitary fittings', or part of total water bill	Sometimes specified, or part of mixed hygiene products	No	Mixed with housing costs	Sometimes plumbing cost	No	No	Water dispenser sometimes	Metres	No	No
Integrated Surveys	Yes (varies between survey)	Yes (varies between survey)	No	No	No	No	Yes, usually	Yes, sometimes	Not specified	Metres (usually)	Yes, some-times	Yes, some-times
LSMS	Yes	Sewerage together with water cost	Personal care products or toilet soap	No	Home improve-ments	Repair and maintenance	Sometimes	Sometimes asked if they boil water	Sometimes water boiler	Sometime s metres	No	No
MICS	No	No	No	No	No	No	Yes	Yes	Only hard-ware type	Time	No	Yes
Census	No	No	No	No	No	No	No	No	No	No	No	No
Priority Surveys	No	No	No	No	No	Part of rent, repair and maintenance	No	No	No	Some-times metres	No	Yes, some-times
SEMS	Yes (varies between survey)	Yes (varies between survey)	No	No	No	No	Yes, usually	Yes, sometimes	Not specified	Metres (usually)	Yes, some-times	Yes, some-times

Water access to off-plot sources is identified by most surveys, but they vary whether the distance is expressed in metres (expenditure, integrated, LSMS, SEMS) or time per journey (CWIQ, DHS, MICS). The total access time per day is collected in some but not all integrated and SEMS surveys. The identity of the water hauler is collected routinely in MICS surveys, in past DHSs (no longer included) and sometimes in integrated, priority and SEMS surveys.

The CWIQ only asks the time to water source. It does not identify the water hauler, but the respondent is asked why there is only "occasional or non-use" of services, and where "too far" is one of the possible responses. The CWIQ also asks whether the respondent is satisfied with the service or not. Also, in relation to distance, the respondent is asked what is the usual means of water collection (on foot, mechanized vehicle, or non-mechanized vehicle).

Type of fuel used for cooking (and hence boiling water) is commonly included in DHS, MICS, and living standards surveys and in censuses. The financial cost of fuel is collected by income and expenditure surveys, and some non-LSMS surveys. Time to collect fuel is commonly captured by income and expenditure surveys (distance and place), non-LSMS surveys (distance and identity of collector), and priority surveys (distance and identity of collector) but not by CWIQ, DHS or MICS surveys.

Time to access off-plot sanitation facilities (or place of defecation) is not captured by any national surveys. Some research studies have included a question on time to place of defecation for valuation of access time [19].

Other national surveys on household spending

The public expenditure review (PER) is a commonly-applied tool with increasing application in the water sector. The PER includes both transfers of public funds to the sector as well as contributions by water users. According to Trémolet, the World Bank funded 40 PERs between 2003 and 2009 in which the water sector features (see Annex B). At the time of writing, five more detailed WSS PERs were ongoing and expected to be completed during 2011 [20]. PERs tend not to include resources provided by households to the sector, hence they are not a potential source of data for measuring household-level affordability indicators [21-23].

Data from service providers (tariffs)

Data can be gathered from individual utilities that have billing information, but this approach is not feasible for global monitoring, due to the workload it entails. As Trémolet (2011) concludes: *"Information on tariffs paid to 'official' WASH service providers exists at a disaggregated level, but obtaining this information usually requires careful examination of the service providers' financial accounts and tariff schedules. This can be particularly difficult when the provision of WASH services is highly decentralised and/or informal service providers play an important role. In some countries, national water sector regulators (such as Zambia) or national utility associations (such as Brazil) collect this information but this remains the exception rather than the rule."*

One major possibility for addressing the problem of lack of compiled data at national level causes by fragmented service delivery is the increasing availability of regional and global databases for water and sanitation utilities. The IBNET databank – managed by the Water and Sanitation Program of the World Bank – provides water and wastewater expenditure data. Tariffs / average revenues are

provided for individual utilities, and these could in theory be aggregated from the database using an average tariff. One indicator of IBNET estimates average revenue per population as a proportion of GNI per capita – thus providing some measure of affordability at a localized population level, but no breakdown is provided between population groups (e.g. rich versus poor). Statistics are also available from IBNET on the fixed part of the water tariff (monetary value, and value as a proportion of the total bill); and the cost of 6m^3 per household per month for piped water. At present, IBNET covers 110 mainly developing countries and therefore is not a truly global database. Some countries have a high degree of coverage of utilities (e.g. Albania, Moldova, Brazil, Kenya, Zambia). In about 20 countries (Francophone Africa and small states) water is provided by only one utility that covers all urban areas. While in all other countries, a number of utilities in different sized cities and towns are sampled, with the assistance of the local associations of water utilities giving a partially representative cross section of the municipal water sector. The provision of data by utilities is voluntary. IBNET updates data from about 60 countries a years. While IBNET intends to continue expanding its coverage, it is not clear how fast the expansion will take place, and at what point it could be said to be representative at country and global levels. In the first edition of the IBNET Blue Book (2011) it was reported that it covers nearly 45% of the water market of developing countries. As a programme of the World Bank, IBNET cannot collect information in developed countries if the data are not publicly available. The IBNET has a global tariff program that partially compensates for this gap. It developed a "normalization formula" where the IBNET water tariff database reports the water price charged to the domestic users per m^3 for the first 15 m^3 consumed through the 20 mm (5/8 inch) pipe according to the formula[22]:

Tariff per m3 = [Connection fee + volumetric charge per 15 m^3 per month + taxes and other fees] / 15

IBNET already has a database with tariffs of 220 water companies, and is planning to collect tariff data from 1600 utilities by June 2012.

Information on other types of "tariff", such as tariffs paid to informal WASH service providers or investments made by households in their own installations (such as latrines) are neither tracked by IBNET nor any other country or regional utility regulators or associations. A number of studies have sought to estimate the value of these flows, but this has been done on a one-off basis rather than on a comprehensive basis. Available evidence shows that these flows are likely to be substantial, particularly for sanitation [24]

Future data sources

Tremolet in her paper lays out basic proposals for a common methodology to track financial flows at national level [20]. The proposed methodology has been developed based on learning from the National Health Accounts in the health sector and similar initiatives in the WASH sector. This methodology was planned to be developed and tested in a multi-country pilot study, to be reported in the GLAAS 2012 report. However, progress has not been made on this study, and it is uncertain if and when the study will go ahead. Therefore, it is not known whether improved data sets will be available after 2015.

[22] Source : www.ib-net.org

The System of Environmental-Economic Accounting for Water (SEEA-Water) provides a conceptual framework for organizing hydrological and economic information in the water sector in a coherent manner. The UN Statistical Commission adopted SEEAW as an international statistical standard in 2007. Many countries (54 so far) have expressed interest in using the standard. However, it is unsure at present how many countries will adopt the standard, when it will be adopted, and how this could contribute to global WASH sector monitoring after 2015.

2.3.3 Household income and expenditure (denominator)

Chapter 2.3.1 introduced nationally-representative surveys and Chapter 2.3.2 reviewed relevant data on WSH expenditure that can potentially be extracted from these surveys. These surveys are reviewed for the information they provide on total household income and expenditure. Table 7 provides a summary of results.

Data on income are available from most types of survey, except DHS, MICS and most Censuses. However, the level of detail of questions varies significantly between income and expenditure surveys (IES), living standards surveys and SEMS – which provide the most detailed information – and CWIQ and priority surveys – which provide the least detailed information. The DHS, MICS and Censuses do ask questions on durable assets, enabling a form of disaggregation by 'wealth' quintile. Some Censuses asks what types of benefits are claimed; however, this may be relevant only for countries where a benefits system is functioning. All surveys ask some questions about employment and work situation of household members, but there is significant variation in the level of detail collected by the different surveys.

Given the sometimes unreliability of household surveys to capture income, a measure of total expenditure is sometimes a better measure of income than asking direct questions on income. The most detailed and robust data on total expenditure are collected by income and expenditure surveys, followed by living standards measurement surveys. The level of detail for integrated surveys and SEMS varies between different types of survey. The CWIQ and priority surveys mainly collect major expenditure items; however, with such aggregate questions, there is a risk that the expenditure estimates do not fully capture all expenditures. The DHS, MICS and Censuses do not collect total expenditure data.

In terms of global coverage, almost all countries are covered by at least one survey in the past five years asking detailed questions on income and expenditure (see Annex A).

Table 7. Sources of data on household income and expenditure

Survey Instrument	Employment status of household members	Income			Total expenditure
		Salary	Non-salary	Other production or income	
CWIQ	Yes	Yes, income stated under 12 main items, including salaries, gifts, sale of assets and remittances			By 10 main expenditure categories
DHS	Only women age 15-49 and men age 15-54 or -59	% cash income	% in-kind income	% other unpaid work	No
Income & Expenditure Surveys	Yes	Yes, detailed questions on all sources of income		Identifies food consumed that was freely received	Very detailed
Integrated Surveys	Yes	Yes, detailed questions on all sources of income			Yes, but level of detail varies between survey
LSMS	Yes	Yes	Yes		Yes, detailed
MICS	No (only child labour)	No	No	No	No
Census	Yes	Type of employment	Type of benefit claimed	No	No
Priority Surveys	Yes	Yes, major categories of income		No	Yes, major items only
SEMS	Yes	Yes, detailed questions on all sources of income		Identifies food consumed that was freely received	Yes, level of detail varies

2.3.4 Synthesis of data sources per variable and indicator

Table 8 presents the 12 numerator variables and 2 denominator variables showing which of these are required to measure for each of the four indicators, and showing further which are the main data sources per variable. The table shows how indicator IO.3 builds on IO.1 and IO.2, and how IO.4 builds on IO.3 (refer back to Figure A). It also shows clearly how indicators IO.3 and IO.4. draw heavily on other available research, utility data and additional research. Note that variables numerator variables N3, N4 and N5 are only required for indicators IO.3 and IO.4 if the pricing of services paid by households excludes capital costs. If capital costs are indeed excluded, the duration of capital items is required to estimate annual equivalent costs. Additional research (final column) is mainly in the form of unit cost studies, but also sanitation access time. Furthermore, consensus needs to be found on an appropriate methodology for valuing access time.

Table 8. Variables required to measure indicators, and main data sources

Code	Variable	Indicators				Data sources				
		IO.1	IO.2	IO.3	IO.4	Surveys		Available research	Utilities & providers	Additional research[1]
						IES	Other			
D1.	Household income	√	√	√	√	√				
D2.	Household total expenditure	√	√	√	√	√				
N1.	Water access expenditure	√		√	√	√				
N2.	Sanitation or wastewater expenditure	√		√	√	√				
N3.	Water capital expenditure		√	√	√	(√)		√	√	√
	Duration of hardware			√	√			√	√	√
N4.	Sanitation capital expenditure		√	√	√	(√)		√	√	√
	Duration of hardware			√	√			√	√	√
N5.	Hygiene capital expenditure		√	√	√			√	√	√
	Duration of hardware			√	√			√	√	√
N6.	Household water treatment			√	√		√	√		
	Unit costs of treatment			√	√			√		√
N7.	Other sanitation recurrent expenditure			√	√			√	√	√
N8.	Hygiene recurrent expenditure			√	√			√		√
N9.	Water collection time				√		√	√		
N10.	Fuel collection time				√		√	√		
	Percent of fuel for water treatment				√			√		√
N11.	Sanitation access time				√			√		√
N12.	Economic value of time				√			√		√

√ - affirmative in most or all cases; (√) – affirmative in few or some cases; 'IES' - refers to surveys that collect detailed information on income and expenditure; 'other' – refers to other surveys such as DHS, MICS, CWIQ. [1]Additional research – conducted for the purposes of global monitoring.

3. Evaluation of 'affordability' indicators for global monitoring

3.1 Criteria for evaluation

Four main criteria were used to evaluate the candidate indicators:

1. How well does the indicator reflect affordability? Is it valid?
    - Content validity: are the components that make up the indicator reflecting affordability? Are the components comprehensive?
    - Estimation validity: is the way in which the components constructed according to acceptable methodological standards?
    - Accuracy: are the data sources reliable enough to give sufficiently precise estimates of affordability?
    - Validity of disaggregation by population groups

    A separate assessment of validity of both the numerator and denominator is needed. Also, affordability is a relative measure: an affordability threshold has to be defined to indicate whether a household a defined as consuming unaffordable WASH services. Hence the validity of the threshold has to be examined.

2. Is the indicator likely to have good uptake?
    - Is it relevant for the sector?
    - Is the indicator bankable? That is, does it fit with the current agendas of key decision makers inside and outside the sector?
    - How easy is the indicator for non-specialists to understand?

3. How comprehensive and representative are the available data sets?
    - Globally – can the indicator be monitored in a majority of developing countries?
    - Nationally – do surveys conduct representative nationwide sampling?

4. What resources are required to measure the indicators?
    - What further data collection is required?
        - Adding to existing surveys: what variables specifically would be added?
        - Defining new surveys: what variables specifically would be collected by these surveys?
    - Data extraction and compilation.
    - Data analysis (when calculations are needed).

The four indicator options were evaluated according to these four areas. A summary is presented in Chapter 3.6 in Table 12.

3.2 Validity

3.2.1 Validity of numerator (WSH expenditure)

The cost of water, sanitation and hygiene (WSH) services is the focus of all four candidate indicators. The indicators selected for evaluation were chosen because they have a high general validity. In particular, established techniques exist for estimating the different types of cost detailed in the indicators. However, they do vary when examining different types of validity. First, do the WSH costs captured

by each indicator cover all the WSH costs that are actually incurred by households (content validity)? Second, of those WSH costs captured and valued, is the technique for estimation acceptable (estimation validity)? Third, are the data available for the estimation reliable (accuracy)?

1. Content validity

If an indicator does not include all the major types of WSH cost, then it will underestimate the proportion of households faced with unaffordable WSH services. Hence, the indicator should be as comprehensive as possible.

As described in Chapter 2, several types of WSH cost may not be captured by expenditure surveys whose questions focus on regular monthly payments for water and wastewater services. The general differences in contents of the IO.1, IO.3 and IO.4 were shown in Figure 1. The situations under which the indicators have content validity (adequately comprehensive) are explored below:

IO.1: Subset financial costs

- Has a basic minimum of content validity when services are networked and easily identifiable as monthly (or annual) costs, and when households do not have to take further actions to ensure tap water is safe. However, on-site sanitation costs and hygiene costs will usually be omitted.
- Has inadequate content validity when services are not networked and WSH expenses vary from month to month, or are made up of daily payments. Also, IO.1 has limited content validity when monthly charges do not include the investment/capital cost (see IO.2).

IO.2: Capital costs

- Has a basic minimum of content validity when a clear financial capital cost for WSH services can be extracted from expenditure surveys.
- Has inadequate content validity when a major part of the capital cost was in-kind contribution (i.e. an important cost element has been omitted).
- When used alone, this indicator has low content validity because it excludes operations and maintenance costs.
- In few settings, mainly OECD countries, the tariff structure will capture some or all of the capital costs. Hence, where this is the case, combining IO.1 and IO.2 will in effect 'double-count' the investment costs. However, the purpose of this indicator is to identify if the capital costs are themselves unaffordable for some population groups, so the indicator still remains relevant.

IO.3: Full financial costs

- Has improved content validity over IO.1 when services are not networked and expenses are paid more on a daily than a monthly basis.
- Has inadequate content validity when an important share of the costs are non-financial in nature (such as household time investments).

IO.4: Full financial and economic costs

- Has improved content validity over IO.1 and IO.3 when an important share of the costs is non-financial in nature (such as household time investments).

This indicator will better capture affordability constraints for populations who have to travel for their water and sanitation needs.

All indicators have inadequate content validity when service levels do not meet the normative criteria of the human right to water and sanitation, especially the financial cost components.

2. Estimation validity

In order to capture WSH costs that are not clearly identified as a financial value from expenditure surveys, some further estimations are needed to ensure they are captured. This involves putting together further cost estimates using a defined methodology. For IO.3 this involves annualizing capital costs associated with water treatment devices and on-site sanitation and hygiene hardware, as well as estimating the recurrent costs of water treatment, on-site sanitation, and hand washing costs (soap, water). In addition, for IO.4, it involves estimating the time spent in different WSH services – water collection and sanitation access – and applying an estimate for time value.

IO.1: Subset financial costs

- Has a basic minimum of estimation validity when separate questions are asked in the survey on WSH expenditure.
- Has inadequate estimation validity when WSH expenditure is merged with housing or general utility expenses.

IO.2: Capital costs

- Has a basic minimum of estimation validity when separate questions are asked in the survey on WSH capital expenditure.
- Has inadequate estimation validity when WSH expenditure is merged with general housing capital expenditure, or there is no question that includes WSH capital expenditure.

IO.3: Full financial costs

- Has a basic minimum of estimation validity when separate questions are asked in the survey on capital expenditure on household water treatment devices (e.g. filter), on-site sanitation facility, hand washing station and soap costs.
- Has reduced estimation validity when fuel costs for boiling water have to be assumed from overall fuel costs, and when soap costs are not separated from general hygiene expenditure.
- Has inadequate estimation validity when there are no separate questions on capital expenditure on household water treatment devices (e.g. filter), on-site sanitation facility, hand washing station and hygiene products. In these cases, costs for these items will need to be estimated based on assumptions about products purchased, their prices and behavioural factors which determine rate of use.

IO.4: Full financial and economic costs

- Has the same estimation validity issues as indicator 3, plus:

- Has a basic minimum of estimation validity when separate questions are asked in the survey on water hauling time per day, fuel collection, type of water treatment method, and identity of main water hauler.
- Has compromised estimation validity when water hauling estimate is for one trip only but the number of trips per day is not collected; when the identity of the main water hauler is not provided; and when the type and frequency of water treatment method is not provided.
- Has reduced estimation validity for sanitation because the access time for sanitation is not available from any national surveys.
- Has compromised estimation validity for all access time valuation because an estimate must be provided for the value of time. This can either be evidence-based (e.g. willingness to pay studies) or based on an assumption on the value of time as a fixed proportion of the average wage or average GDP per capita.
- Has inadequate estimation validity when there are no surveys with separate questions on distance or time to water source.

Overall, estimation validity is affected especially for IO.3 and IO.4 by the fact that data will need to be assembled from different data sources, and may require research and assumptions to tabulate values for some expenditure categories.

3. Data quality

There may be inaccuracies introduced in the survey data due to interviewer error, respondent error, or the survey questions or response categories not fully reflecting the entire range of field settings. The degree of error depends in large part on the complexity of the question, the time period to which the question relates (and the recall of the respondent), and the identity of the respondent (whether they have direct knowledge of the expenditure incurred by the household). Also, if the questions are not detailed enough – for example, expenditure categories – then it increases the chances of either omitting or double-counting some expenditure items. General assessment is provided below of different expense categories:

IO.1: Subset financial costs

- Water recurrent expenditure: separate item in expenditure surveys. The question will be most accurately answered by households with networked supply and a regular billing mechanism. For households who purchase their water supply from vendors or irregularly (e.g. tanker truck) there may be varying daily consumption and prices. Hence the value given by the household will be an estimate, potentially lacking precision.
- Sanitation recurrent expenditure: separate item in expenditure surveys when wastewater services are included in the category. For non-networked services, the expenditure on sanitation is more 'lumpy' and hence there will be less households responding with expenditures in this category. With many non-networked households not responding to this question, it introduces uncertainty in the best method for averaging costs across households.

IO.2: Capital costs

- Capital items: clear when there is separate water or sanitation categorisation in the expenditure survey. As investments do not occur every year, an expenditure survey will capture the investment expenditure of only a small proportion of households. When averaged over the entire population, there is a risk that the resulting average values are inaccurate. Accuracy will depend on the sample size. In settings where networked solutions (and high population coverage) have existed for some time, the connection costs – which is in effect a contribution to capital costs – will no longer be captured by an expenditure survey.

IO.3: Full financial costs

- Hygiene recurrent expenditure: it can be more accurately captured when 'hygiene products' is a separate line item in the survey questionnaire. However, this is not usually the case; hence it will be difficult to draw on available national surveys to estimate hygiene costs.
- Capital maintenance: expenditure surveys do not have separate categories or questions on water or sanitation maintenance costs; hence this item cannot be estimated.
- Water treatment: survey questions (e.g. DHS, MICS) do not capture the nuances of household water treatment behaviour. A household may sometimes but not routinely treat water for drinking and other purposes. Also, some households may use multiple water treatment methods but only report on one of them.

Table 9. Summary of validity for WSH costs

Indicator	Content validity	Estimation validity	Data quality
1. Subset financial expenditure	• High – when networked regulated services • Low – when large proportion of costs are related to non-networked services	• High	• High – when separate questions on water and wastewater expenditure • Medium – when water and wastewater expenditure merged with housing and utility expenditure
2. Capital costs	• High – when used as a secondary measure to indicators 1, 3 or 4 • Low – when used alone	• High	• High – when available as distinct expenditure category in surveys • Medium – when separate estimates are required from research
3. Full financial expenditure	• High – when WSH services are on-plot • Low – when important part of WSH services available off-plot	• High – when required estimation variables available from surveys • Medium to low - when required estimation variables not available from surveys	• High – when questions and response categories reflect well the field reality • Medium to low – when field realities are more complex than provided for in survey design
4. Full financial and economic costs	• High		

IO.4: Full financial and economic costs

- Water access time or distance: the estimate is based on the respondent's own estimate, which may not be wholly accurate. Values can only be

validated if the enumerator of the questionnaire is familiar with the water source and hence can question the respondent about their answer.

- Fuel access time or distance: same issue as water access above.
- Water hauler identity: the person hauling water or collecting fuel may vary from day to day, hence a single answer will not reflect accurately the reality. This issue is only relevant when different haulers would be assigned a different value of time.

3.2.2 Validity of denominator (total income and expenditure)

The data points on income (D1) and total expenditure (D2) are reviewed for content, estimation and data validity.

1. Content validity

The content validity is high for both income and expenditure data collected from nationally representative surveys. It should be noted though that some surveys do not include the same scope of categories as the most detailed income and expenditure surveys (see Chapter 2.3.3).

Income surveys generally measure gross household income, with disaggregation by different types of income. Various types of salary and non-salary income revenues are included, as well as – in the more detailed surveys – valuation of non-cash earnings. While most surveys that collect income data attempt to collect comprehensive data, some surveys do not ask such detailed questions on non-salary income (such as interest from savings, revenues from shares, saved expenditure from living in own property and not paying rent, and receipts from the welfare state), the value of non-financial transactions or wealth. Such omission will have implications at both ends of the income spectrum: for higher-income households it will lead to *higher* values of the affordability indicator, as these households are significantly more likely to have additional sources of income and more assets. At the other end, non-financial transactions are more important – in relative income terms – for poor and agricultural households, and those involved in the informal sector. Hence when income is not fully measured, WSS services may account for a higher proportion of household's disposable (cash) income, given that many of their other needs may be met via a non-cash or informal economy.

Expenditure surveys capture all expenditure categories, but the level of detail of the expenditure items varies between surveys (see Chapter 2.3.3).

In measuring the affordability indicator, the most detailed income and expenditure surveys should be used, if available. If such surveys are not available, or they were conducted several years previously, other surveys such as CWIQ and priority surveys, can be used instead.

2. Estimation validity

Data on income and expenditure required for the affordability indicators can generally be extracted directly from the survey database, and do not need estimation.

3. Data quality

The quality of data relies on the willingness of the respondent to share information, their ability to recall incomes and expenditures over the requested period, and their knowledge of household incomes and expenditures.

On income, households may not be willing to declare parts of their income, leading to underestimates. Incomes that occurred longer ago are more likely to have recall problems, leading to inaccuracy.

On expenditure, not all categories of expenditure may be well reflected in some surveys, or properly detailed by the interviewer. Depending on the detail of the questions, some less usual items are likely to be forgotten.

Due to the piecemeal nature of many expenditures and incomes (e.g. from small businesses, and informal workers), there are constraints to accuracy. In particular, there are inherent difficulties in measuring income of subsistence farmers and those who receive wages partially or wholly in-kind, even when the questionnaire includes questions on these aspects.

For both income and expenditure items, the respondent answering the survey may be the wrong person to answer such questions. If the head of household, main income-earner or person controlling the expenditure are not available, then there may be major inaccuracies or gaps. How the enumerator deals with this during the interview, and how gaps and known inaccuracies are dealt with at data analysis stage, will need to be assessed when compiling data for measuring the affordability indicator.

3.2.3 Validity of disaggregations

An affordability indicator is most relevant to evaluate for specific populations rather than the entire population of a country. However, the validity of affordability indicators disaggregated by different population groups will depend on the sample sizes of the population sub-group for whom the disaggregation is required, and in the case of composite indices – the validity of the methodology for constructing the index.

One set of important disaggregations of the affordability indicator relates to the income or wealth of households. In countries where household income, expenditure or budget surveys are carried out, there will be significantly better information for poverty classification of households. However, the majority of health and social surveys do not conduct detailed assessments of income and expenditure; hence they do not have the information required to estimate income quintiles[23]. Instead a methodology is used that identifies household assets, and the nature of those assets (e.g. building materials), to estimate 'wealth' quintiles. Assets are assumed to be an indicator of both income and wealth – because people who earn more are likely to spend an important proportion of their income on assets. Hence, the quality of any wealth quintile analyses will depend heavily on this assumption. Furthermore, as the asset list includes water source and sanitation facility, some endogeneity (circularity) is introduced into the analysis of

[23] 'Quintiles' divide the population into five groups based on how they score in relation to different indicators (e.g. income, wealth).

affordability indicators by wealth quintile. On this latter point, it is feasible to exclude water and sanitation facility from the calculation of wealth quintiles.

A second issue of presenting affordability indicators by wealth or income quintiles (or deciles) is that they are a relative rather than absolute measure of poverty. The quintile or decile approach does not identify clearly who is actually poor according to some absolute level of income or asset ownership, and hence does not enable robust conclusions on the proportion of poor who are faced with unaffordable services.

Wealth and income analyses only enable assessment based on material wealth. Other 'challenged' populations are not taken into account. Disadvantaged and vulnerable household of interest are those with special characteristics and / or needs (see Chapter 2.1.5). The ability to assess affordability indicators depends on the sub-classifications provided by each specific survey, and the sample sizes of each. Further information is provided in the background paper prepared for the Equity and Non-Discrimination working group[24].

3.2.4 Validity of thresholds

All four indicators are defined as a ratio, with the implication that the ratio is judged to be 'affordable' or 'unaffordable' based on comparison with a threshold. The validity of the whole exercise therefore rests on what the threshold is, how it is defined, and what happens once the threshold is breached. Hence, below some issues are explored which need to be taken into account to ensure the most appropriate affordability threshold is chosen.

One observation of the threshold values used internationally and in selected countries is that they tend not to be backed up empirically. Threshold values set by countries range from 1 per cent to 5 per cent, and development partners from 3 per cent to 5 per cent [4]. But what underlying evidence and criteria are these values based on?

In setting a threshold value, there are two angles from which to approach the issue:

1. What cost can minimum WSH services be provided at? There is no policy relevance in setting a threshold so low than no provider can provide services at a cost that would be 'affordable'. Hence, the threshold is based on what the price of the minimum service is, and the average income of the target household. The household income may be that of a poor household (e.g. as in the case of Portugal) or that of an average household (e.g. as in the case of a study conducted in Egypt – where the aim was to achieve basic cost recovery of the service).

2. What essential services should a household consume? Hence, what is the *right* level or proportion of expenditure for a household to spend? This approach largely reflects the human rights literature, where the threshold value should be set as an upper limit which poor households should not have to pay more than, otherwise risking the consumption of other essential services and products.

[24] Background note on MDGs, non-discrimination and indicators in water and sanitation. Margaret Satterthwaite. 2012.

To compare the thresholds that these two approaches lead to requires context-specific empirical studies.

In setting an affordability threshold, it needs to be determined what level of service the threshold should reflect. There are strong practical arguments for measuring actual expenditures on WSS services, given that these are the levels of service being consumed by households. Furthermore, by costing different levels of service than those currently received could lead to large inaccuracies. However, the problem with this measure is that the current service may be significantly *more* or *less* costly than the minimum requirement for meeting human rights obligations. One result of using actual expenditure is that households consuming a high level of service may be shown as paying more than the defined threshold value. Therefore should such households be provided financial support? Another more serious consequence of using actual expenditure is that households consuming less than the minimum may be shown to be consuming "affordable" services, and hence diminishes the justification for government intervention from the affordability angle.

Where there is an established WSS provider and the service extension can be easily costed, then the hypothetical costs for meeting the human right may be easy to calculate (e.g. when the connection cost and the cost per m^3 of water and wastewater services can be estimated). In many circumstances, however, it will be challenging to accurately estimate the costs of providing WSS services to meet the minimum requirements of the human rights obligation. For example, it may not be clear who will provide a service, or whether extended services can be provided at the same unit cost as existing services. Furthermore, the minimum requirements to meet the human right to safe drinking water and sanitation have not been fully elaborated in terms of concrete criteria to be applied (e.g. what daily quantity of water?), and how this may vary between different contexts (e.g. rural versus urban). These are challenges that must be addressed in defining an affordability indicator.

Until now, most threshold values combine water and sanitation rather than treating them separately. This makes sense given that water and sanitation are often dealt with by the same agency and they are seen as belonging to the same expenditure category (e.g. in expenditure surveys). However, when services are provided by different providers, it may give rise to difficulties – in terms of deciding what the relative cost contribution of each should be.

Most threshold values proposed are single values, to be applied to all population groups, and thus do not account for the different situation of households. Given the very different expenditure patterns of different income groups and different households (e.g. age group composition), it does not make sense to have a single threshold value. For example, using WSH expenditure as a proportion of household income does not allow for differences in the number and type of dependents in a household. Households vary considerably in terms of the number of members, and the ratio of dependents to income-earners. A poor household with one income earner and five dependents will be under significantly greater financial stress than a poor household with no dependents. Also, larger households are likely to have higher WSS expenditure than smaller households. These facts may justify having a lower threshold value for households with higher dependency ratios. Also, it could be argued that poorer households should have *lower* threshold values than non-

poor households, as poor households spend a higher proportion of their income on food, hence leaving a smaller proportion of their disposable (cash) income for other essential items such as basic education, health care and WSH services.

The affordability threshold value should also vary depending on the mechanism via which subsidy is provided. If a household receives a price reduction for water, the consumption cost is reduced by the same amount. If a household receives a financial support to pay for water, income is increased. While the net impact on the household economy is the same under the two scenarios, the affordability ratio will have a different value [4]. This can be explained empirically. If a household has US$ 100 monthly income and WSH expenditure is US$ 10 per month, the affordability ratio is 10%. If the current subsidy is provided via income support, the affordability ratio is: 10 / (100+5) = 9.52%. If the current subsidy is instead provided via consumption support, the affordability ratio is: (10-5) / 100 = 5%. This example shows quite considerable differences in the affordability ratio from two different support measures. If the threshold value is defined at 7%, then the policy response would vary under the two initial subsidy approaches.

3.3 Relevance and uptake

In the process of reducing the long list of proposed affordability indicators to the four indicators evaluated in this paper, a number of indicators were excluded because they were not highly relevant and there would be some difficulty in having them accepted as global indicators (see Chapter 2.1 and Table 3). The four indicator options assessed further in this paper are reviewed for relevance and uptake in Table 10.

Table 10. Summary of criteria for relevance and uptake of indicators

Indicator	Relevance	Politically acceptable	Understandable
IO.1. Subset financial recurrent expenditure	• High degree, assuming the components measured capture the majority of overall costs	• Likely to be the most acceptable option	• Easy to understand
IO.2. Capital financial expenditure	• Only useful as a secondary measure to complement indicators 1, 3 or 4	• Likely to be acceptable to politicians	• Easy to understand
IO.3. Full financial recurrent expenditure	• High degree, assuming the components measured capture the majority of overall costs	• Concerns that the costs will be intentionally inflated • Indicator seen as a more comprehensive measure of WSH expenditure	• Relatively easy to understand • May require brief explanations of what is contained in the indicator
IO.4. Full economic costs	• High degree	• May be less acceptable to politicians as indicator is not fully based on financial values – economic estimates require research methods and assumptions • Political will could be obtained by explaining that the indicator includes social welfare	• Relatively easy to understand • May require brief explanations of what is contained in the indicator • Opportunity cost of time is generally understood, but not all people may agree on its inclusion or the valuation method used

The three indicators comparing total WSH expenditure with income were assessed to have a high degree of relevance. The actual degree of relevance depends on the content validity of the expenditures, assessed in Chapter 3.2.1. For example, if there are important non-financial costs, then indicators IO.1, IO.2 and IO.3 will not be highly relevant. The relevance of the capital costs is relevant as a secondary measure to complement the other indicators.

In terms of political acceptability, it is likely that the subset of financial costs are the most acceptable as this indicator involves the least risk given that it is already used in many countries, it does not requite estimation via research methodologies, and it requires the least amount of effort and funds to construct (see Chapter 3.5). For the same reasons, a comparison of capital expenditure in IO.2 with annual income would also be acceptable by politicians. These conclusions are valid for politicians who prefer the status quo. However, for politicians trying to raise the profile of water and sanitation, focusing on a subset of WSH costs may be inadequate for advocacy purposes. Hence indicators IO.3 and IO.4 may be referred by politicians that want to highlight the issues of affordability amongst the poorer and marginalized populations.

Concerning understandability to non-technicians or non-economists, all indicators are relatively easy to understand. Indicators IO.3 and IO.4 may initially require more explanation of the components contained than IO.1 and IO.2.

3.4 Coverage of data sources

In the process of reducing the long list of proposed affordability indicators to the four indicators evaluated in this paper, a number of indicators were excluded partly because the coverage of data sources was limited and hence there would be some difficulty in generating datasets for all countries.

The number of countries covered by the surveys assessed in Chapter 2.3 is high. IO.1 can be reported on using data from any income and expenditure survey that includes a question on regular WSH expenditure; but the expenditures of networked households are better captured than those of non-networked households. IO.1 could also be estimated for a given minimum quantity of water per household, rather than actual consumption levels.

Data required for IO.2 on WSH capital investments are largely absent from national surveys (see Table 6) and would therefore need to be collected from available costing studies of specific locations such as WASHCost (preferred) or generalized estimates obtained by surveying line ministries or service providers.

Data required for IO.3 and IO.4 will need to be assembled from at least two surveys per country, given that data on income, total expenditure and regular water/wastewater expenditure are available from one type of survey (e.g. IES, household budget surveys), while other WSH costs are available from other types of survey (e.g. CWIQ, DHS, and MICS). Only very limited surveys in certain countries contain all these data, such as some LSMS/integrated and socioeconomic monitoring surveys (see Table 6).

Based on the regularity of national surveys, of between 3 and 5 years, it is unlikely that a full update on any affordability indicators will be possible every two years, which is the current frequency of update of JMP estimates[25].

3.5 Resources for monitoring

Ultimately, the indicators chosen for global monitoring will depend on what resources are available for global monitoring. If only currently available data sets can be considered, it will limit which indicators can be selected. If additional questions can be added to existing surveys or additional surveys can be conducted, then different components of the indicators, or different indicators, can potentially be monitored. This section therefore assesses whether any further questions could be inserted into existing national surveys to improve the database for global monitoring of WSH affordability indicators. The section also examines the total effort that is required to monitor the four indicator options.

Additional questions for existing surveys

If existing surveys could be adjusted to include improved questions to capture WSH costs, what would these questions be? Given that there is considerable pressure on surveys to add questions from a range of fields and sectors, any proposals on WSH expenditure information would need to be well justified. The options for additional data collection are considered under the following three categories:

1. Expenditure data that are already collected in expenditure surveys, but requiring further categorisation to enable more precise estimation of WSH costs:
   - Water and wastewater expenditure costs: explicitly distinguish between networked / regular payments and non-networked / irregular payments for WSH services.
   - Capital costs for water, sanitation and hygiene: distinguish as separate from general categories (e.g. housing improvements).
   - Maintenance costs for water and sanitation hardware: distinguish as separate from general categories (e.g. general repair costs).
   - Soap costs: distinguish from general hygiene costs.

2. Expenditure data that are already collected in some surveys, but could be collected in other surveys:
   - CWIQ, DHS and MICS surveys could request recurrent financial cost data for WSH services.
   - Soap costs could be included as an expenditure item in more surveys. If 'soap' is too specific as an item, more general hygiene and cleaning material costs could be included as an expenditure item.

3. Data that is presently not yet collected in any national surveys, that could be collected in the future:
   - Sanitation access time (time to place of defecation) could be recorded for off-plot sanitation options.

[25] Note, however, that for some countries the biennial JMP update does not always draw on new data sources, due to infrequency of relevant national surveys.

The expenditure on networked services is well covered in existing income and expenditure surveys. Greater focus should be on non-networked services, especially those that tend to be underestimated using current survey questions due to irregularity in the expenses, poor recall of respondents, and prices that vary from day-to-day or between seasons.

Given the challenge of successfully achieving uptake of new questions in existing surveys, it is proposed that efforts to start monitoring affordability post-2015 focus instead on fully elaborating the specific variables to be captured, and methods for doing so, with the existing data sources. Variables and methods have been suggested in this paper – but need further discussion and clarification.

Level of effort for global monitoring

The level of effort in tabulating data on the four affordability indicators is expected to vary significantly. Table 11 presents a summary of data that needs to be compiled from national surveys compared with data that needs to be collected (primary collection) or compiled from other existing sources. To monitor IO.1, relatively minor effort is required: when the data from new income and expenditure surveys become available, the relevant expenditure items need to be tabulated according to the agreed disaggregations. To monitor IO.2, some additional effort would be required to collect capital costs of different types of technology in a range of relevant settings, focusing on the main settings where poor and vulnerable households live.

Considerably greater effort is needed to monitor indicators IO.3. and IO.4. Both indicators need data from different surveys to be combined, when they are both available in any single country. Indicator IO.4 requires data to be tabulated from surveys that provide water time access data (such as CWIQ, DHS and MICS). Both indicators also need some research and additional data compilation to ensure all the WSH costs are fully represented. Indicator IO.4 requires more assumptions, especially in relation to estimating the time access costs of sanitation.

Table 11. Summary of criteria for amount of effort

Indicator	Compilation of national survey data	Additional research or compilation
1. Subset financial recurrent expenditure	• Income or total expenditure • Total water and wastewater monthly cost	•
2. Capital financial expenditure	• Income or total expenditure	• Collection of capital costs in different country settings
3. Full financial recurrent expenditure	• Income or total expenditure • Total water and wastewater monthly cost • Treatment method • Water treatment filter or fuel costs • Hygiene financial costs	• Annual on-site sanitation costs in different country settings • Other water purchases not reflected in survey • Other hygiene costs not reflected in survey
4. Full economic costs	• Income or total expenditure • Total water and wastewater monthly cost • Treatment method • Water treatment filter or fuel costs • Hygiene financial costs • Water and fuel access time • Water hauler identity	• Annual on-site sanitation costs in different country settings • Other water purchases not reflected in survey • Other hygiene costs not reflected in survey • Sanitation access time • Value of time

Indicators IO.1 and IO.2 require the least amount of data compilation and analysis. In addition to IO.1, indicator IO.3 requires further data compiled from national surveys, as well as separate collection of expenditure on on-site sanitation and other water purchases that are not always collected in the national surveys. In addition to IO.3, indicator IO.4 requires compilation of water access time from national surveys, as well as assumptions on sanitation access time and valuation of time.

3.6 Synthesis of evaluation

A summary of key strengths and weaknesses of the four indicator options is provided in Table 12.

Indicator IO.1 (subset financial cost) is the most practical indicator because it is relatively simple to tabulate from national surveys that are conducted in most countries; it is the easiest to understand and is likely to be the most politically acceptable; and of the four indicators, it needs the least amount of effort to compile and tabulate the data. On the other hand, the expenditure items included in the indicator are not comprehensive. The excluded expenditure items are most likely to be important for poorer and marginalized populations, who tend to use non-networked services.

Indicator IO.3 (full financial cost) includes the expenditure items in IO.1 and IO.2, and adds some expenditure items that are excluded from water and wastewater services. It is therefore more comprehensive, and for non-networked services and populations who treat their water at home to make it safe, use of IO.3 adds importantly to the WSH expenditures. However, due to these additions, the measurement of this indicator requires other types of survey to be available, and it requires further compilation and analysis of data. It is more complete than IO.1, but it still lacks non-financial access costs.

Indicator IO.4 (full financial and economic cost) is the most comprehensive indicator. It captures the access time of poor and vulnerable groups to access distant WSH services. It builds on data collected in IO.1, IO.2 and IO.3. However, it is the least practical and is most likely to meet with resistance both at political level, and possibly among sector specialists who may feel uncomfortable with the assumptions on valuation of time. The indicator requires research methodologies and additional data collection/compilation.

Indicator IO.2 (capital cost) can serve to increase the validity of the other affordability indicators by providing a perspective on the affordability of the initial investment, which is a major barrier to many households, especially poor and vulnerable households who are the primary focus of the affordability assessment. Given that it excludes recurrent costs, it does not have sufficient validity as a single indicator.

Table 12. Summary evaluation of indicators

INDICATOR	VALIDITY	UPTAKE	DATA SOURCES	EFFORT
IO.1: Sub-set financial WSH household expenditure as proportion of income or total expenditure	√ Until now, has been the dominant affordability indicator used × Excludes some key financial and non-financial costs	√ Easy to understand √ Previous use means that audiences are well sensitized to this indicator	√ Measurable from available data sources √ Measurable from single income and expenditure survey √ Required surveys have been conducted in most countries	- Mainly compilation of data from household surveys needed
IO.2: Capital WSS expenditure as proportion of income or total expenditure	√ Indicates affordability of the upfront investment cost, which is one major barrier to improving WSS × Only refers to investment costs which do not occur frequently	√ Easy to understand × Confusion may arise as investment costs differ depending on type of WSS facility	√ Data available from research studies, or standard prices (e.g. connection fee) × Data generally not available from household surveys	- As well as compilation of data from household surveys, some further rapid research is needed to compute typical investment costs
IO.3: Full financial WSH household expenditure as proportion of income or total expenditure	√ Reflects overall financial costs × Excludes some key non-financial costs	√ Easy to understand √ Target audience likely to understand that complete financial costs need to be included to measure affordability	√ Measurable from available data sources √ Required surveys have been conducted in most countries × Data from different surveys must be combined	- Mainly compilation of data from household surveys needed - Some further research and application of economic methodologies is required
IO.4: Full economic household costs of WSH as proportion of income or total expenditure	√ Reflects overall economic costs to household × Modeling and assumptions introduces uncertainties	√ Can be argued to be all-encompassing measure of 'true' affordability × Not easy to understand or pursue as policy target	√ Most inputs available from existing data sources × Needs two or more different types of survey to compile all data × No data available for some inputs × Economic methodol-ogies and assumpt-ions must be used	- As well as compilation of data from household surveys, more significant further research and application of economic methodologies required

Key: √ - advantage; × - disadvantage.

4. Discussion and conclusion

4.1 What is current WSH expenditure measuring?

Measuring expenditures usually ignores the level of service received. In household surveys that determine WSH expenditure, it is not common that detailed questions are also asked on the level of WSS services received beyond the simple classification toilet/no toilet or piped water/off-plot water source. However, the human right to drinking water and sanitation specifies a number of normative criteria, such as quantity, quality, reliability and acceptability, as well as affordability. Therefore, it is not clear to what extent these criteria are being met for the WSH expenditure that is recorded by national surveys. Also, with respect to the substitution of different essential services as an underlying rationale for measuring affordability, such an indicator does not identify whether households are consuming less WSH services when access costs are higher.

This raises the question of what the affordability criterion should refer to: should it be measured against the existing levels of service, on which current expenditure levels are based? Or should it be measured against some level of standard as specified by the normative criteria of the human right to drinking water and sanitation? And if the latter, what is the standard?

The arguments for measuring affordability against the current level of service is one of practicality, given that these are real expenditure, and the data are available. If this is used, then it will be important that parallel monitoring takes place to ensure the basic standards of the human right to drinking water and sanitation are met:

- The quantity is adequate for basic needs (drinking, cooking, sanitation and hygiene, among others).
- The quality is adequate to enable households to drink the supplied water without getting sick, and without taking additional (expensive) measures to treat the water.
- The supply is reliable: even if it is not continuous, the service is available enough hours per day for households to not need to take other steps to secure their supply.
- The service is culturally acceptable – i.e. there are no constraints for any social groups using the service.

Some country-level evaluations – such as an academic study in Egypt [5] and routine reporting to a regulator in Portugal – do in fact assess water affordability based on norms for water quantity. In these cases, water quantity is 100 litres per capita per day (Egypt[26]) or 120 litres per capita per day (Portugal).

Similarly to these country case studies, hypothetical WSH costs can also be assessed at global level, based on simple calculations for WSH services of minimum quality (e.g. the costs of providing minimum lifeline quantities of water). However, these calculations could become quite complicated (and

[26] In the Egypt study – the Affordability Assessment made the assumption that only the lifeline level of consumption will be ensured under the affordability limit. A lifeline consumption of 100 lpcpd was based on guidance provided by participants at a national consultation event.

theoretical) when the current service level is still well below the human rights standard.

It is clear that in many circumstances, even the majority in some countries, one or more of the normative criteria in the human right will not be met. Hence, what is the factor constraining the delivery of a full, acceptable service? Is cost one of the constraints? In many settings, cost will be a constraint. In such a case, it makes sense to measure the cost per household of providing the minimum service, and compare that against the total expenditure or income of that household. In other words, can a service that meets the human rights criteria be delivered at an affordable cost to the household? If not, can an external agent intervene to reduce the costs to the household. Or should the standards instead be revised to be less ambitious, and hence less costly?

In some settings, the minimum service defined by the human right may no longer be possible. For example, pit latrines can no longer be provided in the majority of urban areas; and the majority of urban households could not live on minimum levels of water supply (20 litres per capita per day), especially if they have a wet sanitation option. Hence, it would be necessary to estimate the cost of providing the minimum level of service *that is appropriate for that context*.

Furthermore, WSS expenditure data may reflect service levels above or different to the minimum or 'preferred' standards. For example, poor households who have to purchase their water at high prices from water vendors will spend a high proportion of their income on water. While this fact is important to identify, it should also be pointed out that other low-cost solutions are possible, and better services could indeed be provided at affordable levels for those households.

4.2 Other indicators to complete the affordability assessment

A single indicator selected for global monitoring will not provide a full picture on affordability alone. Therefore, for more comprehensive monitoring, the global indicator(s) will need to be supplemented with other indicators to complete the picture.

Service prices

WSH unit prices are also relevant to monitor at national level. Prices are well understood and can provide a rapid insight into potential unaffordability. For a global picture, it is feasible to compile data on water and wastewater prices from utilities through the IBNET database, although this database is still not comprehensive for the majority of participating countries. Furthermore, prices vary between utilities, and hence it will be hard to capture the variation in prices between utilities in a single indicator. To assess affordability, it will be necessary to estimate the proportion of poor or marginalized populations in a particular country covered under different tariff regimes. For non-utility water and sanitation service supply, there are no global databases and probably no up-to-date national databases either.

Affordability perceptions

An indicator on perceived affordability could also be instructive for national monitoring. However, it suffers some weaknesses. First, it is subjective rather than objective measure of affordability. Therefore it can only be used to

complement (i.e. not replace) other measures of affordability. Second, no data are yet available to measure perceived affordability, and new questions would need to be added to national surveys to be useful for monitoring. This could take some time.

Factors explaining affordability

Levels of expenditure do not indicate extent of efficiency or competition of a water or sanitation service provider. If services are unaffordable, it is crucial to understand why. If the costs are high due to lack of competition or even due to too much competition (e.g. non-exploited aggregating function of larger scale providers), then the policy response will be different than if efficiency levels were high. Hence some examination is required of the model of provision and the status of the water and sanitation markets to respond to findings of unaffordable services.

'Affordability' also depends on how services are paid for

Data on WSH expenditure do not reflect payment rules and mechanisms. What makes WSS services affordable is not the absolute cost alone, but how customers pay for the service. Beneficiaries of a service, especially poor people, are less able to pay for large one-off costs (such as capital investment) than if the cost was paid off over the lifetime of the hardware. Also, given the seasonal nature of household incomes, households are more able to pay at certain times of year (e.g. post-harvest) than others.

The actual method of payment, or settling bills, is also important for poor people. For utility services, for example, two alternatives have dominated in the developing world: either the customer goes to a bank or payment centre, or the provider sends staff to collect payment from the household. Both of these can involve high transaction costs, even if it is not always financial (e.g. the time of the beneficiary to travel to payment centre). New methods such as electronic bank-to-bank transfer or payment via mobile phones will reduce transaction costs, improve convenience and affordability, and under some circumstances may make new services available to the poor (e.g. if the payment rate increases, providers are more willing to invest). Poor people prefer flexibility, and being able to pay for services when they need them.

A related issue is the consequence of non-payment of a service that has already been provided, relevant mainly for utility services. If households do not pay, do they face being cut off by the service? How long do they have to pay a bill? Are their part-payment options? And if a customer is cut off, are there reconnection charges? Clearly there is a lot of variation in how utilities around the world deal with poor customers, and it will depend on the details of their service agreement, the business's bottom line (e.g. purely commercial?), the degree of cross-subsidisation between poor and non-poor customers, the commercial viability of the utility (e.g. whether it can afford to keep connected loss-making customers), and whether there is an established and pro-poor mechanism for dealing with customers who have difficulty paying.

The 'bigger picture' view on affordability

Affordability indicators that focus on household expenditure do not demonstrate whether society has made the right 'big picture' choices. Society's decisions

about types of services to be provided to the population have major implications for their sustainability, whether they can be scaled up, and how (limited) subsidies are spent. The subsidies paid by local and national governments have to be repaid somehow, via the taxpayer either now, or the future (if paid through debt). Therefore, the distributional effect depends on whom the tax burden falls.

Given the long time periods for which infrastructure is engineered to last, authorities sometimes have a once-in-a-generation or one-in-a-lifetime decision window to make the 'right' decision. The possible consequences of the 'wrong' choice are lower service coverage, due to lack of spare investment funds to extend a service to more households; and faltering service delivery, due to the high unanticipated costs of operations, maintenance and – later – capital maintenance and renovations. The 'wrong' choice may also lock households into paying more than they would have chosen if they had been involved in the decision. Hence lower cost options such as control flow taps (e.g. done in St Lucia), reduces the infrastructure size requirement (which is usually defined by the peak flow rate).

This issue is one of overall framing of the affordability question. Although asking whether the right technology decision has been made may seem too late for past infrastructure choices, on the other hand it brings critical thinking into new choices that are being made all the time on what type of technology should be invested in. Therefore better evidence is needed on the costs of constructing and operating systems sustainably, and how these costs compare to the income – and willingness to pay – of populations.

4.3 Conclusion

This paper has examined the strengths and weaknesses of four major options for an affordability indicator for global monitoring. It was found that no indicator is perfect; each one performs differently against the criteria of validity, relevance, global coverage of reliable data sources, and resources required for global monitoring. The most comprehensive indicator is IO.4, which includes non-monetary access time costs as well as full financial costs. It is therefore considered as the indicator that best reflects affordability. It was also noted that this indicator is also the most challenging and costly to piece together using economic methodologies, data and assumptions from a range of sources. However, indicator options that only capture financial cost will not fully reflect the affordability of WSH services for poor people, whose main cost to access services is time and not money. As affordability monitoring is most important for poor and marginalized populations, the most comprehensive affordability indicator will be important – even necessary – in order to make the exercise worthwhile, and sensitive to the needs of these vulnerable households.

Therefore, if consensus starts emerging that affordability is one of the key criteria for global monitoring, the case will have to be made for raising the additional resources for measuring a comprehensive affordability indicator. If consensus is not found, and resources for post-2015 global monitoring are expected to be limited, then an indicator that captures only financial expenditures could be supported.

All four affordability indicators are calculated as a ratio: WSH costs as a proportion of overall income or expenditure. The purpose of such a ratio is to enable comparison of WSH costs with a defined value, or 'threshold'. If costs are above the threshold, then it signals that WSH costs are becoming *unaffordable*. However, thresholds vary considerably across countries and across international organisations, from as low as 2% to as high as 6%. To be effective, a single value rather than a range is required at global level to judge the affordability of WSH services. The key question is "what value will this threshold take?" It is clearly a political question, because to be meaningful, some form of policy response is needed to reduce WSH costs for certain population groups. Further consultation is needed to define how a global threshold is to be determined. One key question to address is whether the threshold should be based on the (global) average costs which the minimum services can be provided for (if that can indeed be determined)? Or should the threshold be based on what level of expenditure should be made on different essential goods and services for poor and marginalized populations?

To strengthen the case for an affordability indicator, it is proposed that a pilot test is conducted in a small sample of countries, to assess exactly which additional components of WSH costs can be captured – how accurately, how easily and at what cost. The countries should be selected to enable further exploration of different issues that arise around measuring affordability. It is expected that these pilot studies will further support the case for the adoption of an affordability indicator in post-2015 global sector monitoring.

To strengthen the case for an affordability indicator, it is proposed that a pilot test is conducted in a small sample of countries, to assess exactly which additional components of WSH costs can be captured – how accurately, how easily and at what cost. The countries should be selected to reflect a diversity of affordability issues. It is expected that these pilot studies will further support the case for the adoption of an affordability indicator in post-2015 global sector monitoring.

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Annexes

Annex A. Global Coverage and Frequency of Major National Surveys

Table A1. Global Coverage and frequency of Core Welfare Indicators Questionnaire (CWIQ)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Benin	2003	1	na	Questionnaire des Indicateurs de Base de Bien-être
Burkina Faso	2009	4	2 years	Enquête burkinabé sur les conditions de vie des ménages
Burundi	2006	1	na	Questionnaire des Indicateurs de Base du Bien-Etre
Cape Verde	2007	1	na	Questionário Unificado de Indicadores Básicos de Bem-Estar
Congo, Rep.	2005	1	na	Enquête Congolaise auprès des ménages pour l'évaluation de la pauvreté
Gabon	2005	1	na	Enquête Gabonaise pour l'Evaluation et le Suivi de la Pauvreté
Ghana	2003	2	6 years	Core Welfare Indicators Questionnaire
Guinea	2007	2	5 years	Questionnaire des Indicateurs de Base du Bien-être
Guinea Bissau	2010	2	8 years	Inquérito Ligeiro para Avaliação da Pobreza II
Lesotho	2002	1	na	Core Welfare Indicators Questionnaire
Liberia	2010	2	3 years	Core Welfare Indicator Questionnaire
Malawi	2002	1	na	Core Welfare Indicators Questionnaire
Mali	2001	1	na	Questionnaire des Indicateurs de Base du Bien-être
Mauritania	2008	2	4 years	Enquête Permanente sur les Conditions de Vie des ménages
Mozambique	2002	2	2 years	Core Welfare Indicators Questionnaire
Niger	2005	2	na	Enquête nationale sur les conditions de vie des ménages
Nigeria	2006	4	2 years	Core Welfare Indicators Questionnaire Survey
Pakistan	2004	1	na	Core Wel
Rwanda	2003	2	2 years	Enquête sur les Indicateurs de Base du Bien-être
Senegal	2001	1	na	Questionnaire unifié sur les indicateurs de développement
Sierra Leone	2007	1	na	Core Welfare Indicators Questionnaire
Togo	2011	2	5 years	Questionnaire Des indicateurs Base Du Bien-Etre

Table A2. Global Coverage and frequency of Demographic and Health Survey (DHS)

Country	Latest survey	Surveys since 1995	Usual interval period[1]	Survey name
Albania	2009	1	Na	Demographic and Health Survey
Angola	2010	3	2 years	AIDS Indicator Survey
Armenia	2010	3	2 years	Demographic and Health Survey
Azerbaijan	2006	1	Na	Demographic and Health Survey
Bangladesh	2011	6	3 years	Demographic and Health Survey
Benin	201	4	5 years	Demographic and Health Survey
Bolivia	2008	3	5 years	Demographic and Health Survey
Brazil	1996	1	Na	Demographic and Health Survey
Burkina Faso	2010	3	5 years	Enquête Démographique et de Santé
Burundi	2010	1	Na	Enquête Démographique et de Santé
Cambodia	2010	4	5 years	Demographic and Health Survey
Cameroon	2011	3	6 years	Enquête Démographique et de Santé
Cape Verde	2005	1	Na	Enquête Démographique et de Santé
Chad	2004	2	8 years	Enquête Démographique et de Santé
Colombia	2010	4	5 years	Demographic and Health Survey
Comoros	1996	1	Na	Enquête Démographique et de Santé
Congo, Dem. Rep.	2006	1	Na	Enquête Démographique et de Santé
Congo, Rep.	2011	3	2 years	Enquête Démographique et de Santé
Côte d'Ivoire	2011	3	7 years	AIDS Indicator Survey
Dominican Republic	2007	4	3 years	Demographic and Health Survey
Egypt, Arab Republic	2008	7	3 years	Demographic and Health Survey
Equatorial Guinea	2011	1	Na	Demographic and Health Survey
Eritrea	2002	2	7 years	Eritrean Demographic Health survey
Ethiopia	2005	2	5 years	Demographic and Health Survey
Gabon	2000	1	Na	Enquête Démographique et de Santé
Ghana	2008	3	5 years	Demographic and Health Survey
Guatemala	1998	2	3 years	Demographic and Health Survey
Guinea	2005	2	6 years	Enquête Démographique et de Santé
Guyana	2009	2	Na	Demographic and Health Survey
Haiti	2005	2	5 years	Enquête Démographique et de Santé
Honduras	2011	2	6 years	Demographic and Health Survey
India	2005	2	7 years	National Family Health Survey III
Indonesia	2007	3	5 years	Demographic and Health Survey
Jordan	2009	3	6 years	Demographic and Health Survey
Kazakhstan	1999	2	4 years	Demographic and Health Survey
Kenya	2010	4	3 years	Demographic and Health Survey - IV
Kyrgyz Republic	1997	1	Na	Demographic and Health Survey
Lesotho	2009	2	5 years	Demographic and Health Survey
Liberia	2011	3	2 years	Liberia Malaria Indicator Survey
Madagascar	2003	2	6 years	Enquête Démographique et de Santé

Country	Latest survey	Surveys since 1995	Usual interval period[1]	Survey name
Malawi	2011	4	4 years	Malaria Indicator Survey
Maldives	2009	1	Na	Demographic and Health Survey
Mali	2006	3	5 years	Enquête Démographique et de Santé
Marshall Islands	2007	1	Na	Demographic and Health Survey
Mauritania	2003	2	3 years	Enquête sur la Mortalité Infantile et le Paludisme
Moldova	2005	1	Na	Demographic and Health Survey
Morocco	2003	2	8 years	Demographic and Health Survey
Mozambique	2011	3	4 years	Inquérito Demográfico e de Saúde
Namibia	2006	2	6 years	Demographic and Health Survey
Nauru	2007	1	Na	Demographic and Health Survey
Nepal	2011	4	4 years	Demographic and Health Survey
Nicaragua	2001	2	3 years	Encuesta Nicaragüense de Demografía y Salud
Niger	2006	2	8 years	Enquête Démographique et de Santé
Nigeria	2010	4	3 years	Demographic and Health Survey
Pakistan	2006	1	Na	Demographic and Health Survey
Peru	2011	4	3 years	Demographic and Health Survey
Philippines	2008	3	5 years	Demographic and Health Survey
Rwanda	2010	4	3 years	Interim Demographic and Health Survey
Samoa	2009	1	na	Demographic and Health Survey
Sao Tome & Principe	2008	1	na	Demographic and Health Survey
Senegal	2010	5	3 years	Enquête Démographique et de Santé
Sierra Leone	2008	1	Na	Demographic and Health Survey
Solomon Islands	2006	1	na	Demographic and Health Survey
South Africa	2004	2	6 years	Demographic and Health Survey
Sri Lanka	2006	1	na	Demographic and Health Survey
Swaziland	2006	1	na	Demographic and Health Survey
Tanzania	2010	6	2 years	AIDS Indicator Survey
Timor-Leste	2009	2	6 years	Demographic and Health Survey
Togo	1998	1	na	Enquête Démographique et de Santé
Turkey	2008	3	5 years	Demographic and Health Survey
Turkmenistan	2000	1	na	Demographic and Health Survey
Tuvalu	2007	1	na	Demographic and Health Survey
Uganda	2011	6	3 years	Demographic and Health Survey
Ukraine	2007	1	na	Demographic and Health Survey
Uzbekistan	2002	2	6 years	Demographic and Health Survey+,
Viet Nam	2005	3	4 years	AIDS Indicator Survey
Yemen	2010	2	13 years	Demographic and Health Survey
Zambia	2007	3	5 years	Demographic and Health Survey
Zimbabwe	2010	3	5 years	Demographic and Health Survey

[1] The interval period is based on the number of surveys between the first and last survey.

Table A3. Global Coverage and frequency of Income and Expenditure Survey (IES)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Albania	2007	3	5 years	Household Budget Survey
Angola	2008	2	8 years	IncoInquérito Integrado sobre o Bem-Estar
Argentina	2004	3	4 years	Encuesta Nacional de Gastos de los Hogares
Azerbaijan	2005	5	1 year	Household Budget Survey
Bangladesh	2005	3	5 years	Household Income and Expenditure Survey
Bangladesh	2004	1	na	Poverty Monitoring Survey
Belarus	2007	13	1 year	Income and Expenditure Survey (HHS)
Benin	2003	1	na	Questionnaire des Indicateurs de Base de Bien-être
Bermuda	2004	1	na	Household Expenditure Survey
Bhutan	2000	1	na	Household Income and Expendicture Survey
Bosnia and Herzegovina	2007	2	3 years	Household Budget Survey
Botswana	2009	2	7 years	Household Income Expenditure Survey IV
Brazil	2007	7	1 year	Pesquisa Nacional por Amostra de Domicílios
Bulgaria	2007	6	1 year	Household Budget Survey
Burkina Faso	1996	1	na	Enquête sur les dépenses des ménages de Ouagadougou
Cameroon	2007	2	7 years	Enquete Camerounaise Aupres des Menages III
Cape Verde	2001	1	na	Enquête Budget-Consommation
Chile	1996	1	na	Encuesta de Presupuestos Familiares
China	2003	9	1 year	China Rural Household Survey
China	2003	9	1 year	China Urban Household Survey
Comoros	1995	1	na	Enquête exploratoire budget-consommation
Costa Rica	2004	1	na	Encuesta Nacional de Ingresos y Gastos de los Hogares
Côte d'Ivoire	1996	1	na	Enquête sur les dépenses des ménages d'Abidjan
Croatia	2006	7	1 year	Household Budget Survey
Czech Republic	2006	2	8 years	Household Budget Survey
Dominican Rep.	2006	2	8 years	Encuesta Nacional de Ingresos y Gastos de los Hogares
Egypt, Arab Rep.	2005	3	5 years	Household Budget Survey
Estonia	2004	7	1 year	Household Budget Survey
Ethiopia	2010	4	5 years	Household Income, Consumption and Expenditure Survey
Fiji	2002	1	na	Household Income and Expenditure Survey
Gabon	2005	2	5 years	Enquête Gabonaise pour l'Evaluation et le Suivi de la Pauvreté
Georgia	2007	12	1 year	Household Budget Survey (HBS)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Guatemala	1998	1	na	Encuesta Nacional de Ingresos y Gastos Familiares
Guinea	2000	1	na	Enquête sur le cadre de dépense à moyen terme
Guyana	2007	1	na	Household Budget Survey
Hungary	2004	9	1 year	Household Budget Survey (HBS)
Indonesia	1998	4	1 year	100 Village Survey III
Iran, Islamic Rep.	2006	1	na	Households Expenditure and Income Survey
Iraq	2005	1	na	Iraq Rapid Household Budget Survey
Jamaica	2003	1	na	Household Expenditure Survey
Jordan	2006	3	4 years	Household Income and Expenditure Survey
Kazakhstan	2007	10	1 year	Household Budget Survey (HBS)
Kazakhstan	2001	2	1 year	Survey of the living standard of poor families
Kiribati	2006	1	na	Household Income and Expenditure Survey
Kyrgyz Republic	2007	11	1 year	Household Budget Survey (HBS)
Lao PDR	2007	4	5 years	Expenditure and Consumption Survey 2007-2008
Latvia	2004	9	1 year	Household Budget Survey (HBS)
Lesotho	2003	1	na	Household Budget Survey III
Liberia	2007	1	na	Core Welfare Indicators Questionnaire
Lithuania	2007	12	1 year	Survey on Income and Living Conditions
Macedonia, FYR	2006	10	1 year	Household Budget Survey (HBS)
Malaysia	2007	3	4 years	Household Income/Basic Amenities Survey
Malaysia	2004	2	6 years	Household Expenditure Survey 2004-05
Maldives	2002	1	na	Household Income and Expenditure Survey
Mali	2001	2	5 years	Enquête Malienne sur l'Evaluation de la Pauvreté
Marshall Isld.	2002	1	na	Household Income and Expenditure Survey
Mauritania	2004	1	na	Enquête permanente sur les conditions de vie des ménages
Mauritius	2006	2	5 years	Household Budget Survey
Mexico	2006	7	2 years	Encuesta Nacional de Ingresos y Gastos de los Hogares
Micronesia	2005	1	na	Household Income and Expenditure Survey
Moldova	2008	12	1 year	Household Budget Survey
Mongolia	2005	4	3 years	Household Income and Expenditure Survey
Morocco	2000	1	na	Enquêtes sur la Consommation et les Dépenses des Ménages
Mozambique	2008	2	6 years	Inquérito Sobre Orçamento Familiar
Myanmar	2006	3	5 years	Household Income and Expenditure Survey
Namibia	2004	1	na	Income and Expenditure Survey
Nepal	1996	1	na	Household Budget Survey: Urban Nepal
Niger	2007	2	9 years	Enquête Nationale sur le Budget et la Consommation des Menages

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Nigeria	1996	1	na	National Consumer Survey
Niue	2002	1	na	Houshold Income and Expenditure Survey
Pakistan	2001	3	3 years	Integrated Household Survey (Round 4)
Papua New Guinea	2005	2	9 years	Household Income and Expenditure Survey
Peru	2003	1	na	Enquesta Nacional de Hogares
Philippines	2006	5	3 years	Family Income and Expenditure Survey
Poland	2006	9	1 year	Household Budget Survey
Romania	2007	6	1 year	Household Budget Survey (HBS)
Russian Federation	2007	11	1 year	Household Budget Survey (HBS)
Rwanda	1999	1	na	Enquete Integrale sur les conditions de vie des au Rwanda
Samoa	2002	2	5 years	Household Income and Expenditure Survey
São Tomé and Principe	2003	1	na	Inquérito aos Orçamentos Familiares
Saudi Arabia	1999	1	na	Consumption Expenditure Survey
Senegal	2001	2	5 years	Enquête Sénégalaise Auprès des Ménages
Serbia and Montenegro	2008	8	1 year	Household Budget Survey (HBS)
Serbia and Montenegro	2002	1	na	Serbia Household Poverty Survey
Seychelles	2006	2	7 years	Household Budget Survey
Singapore	2002	2	7 years	Household Expenditure Survey
Slovak Republic	1998	1	na	Household Budget Survey
Slovenia	2005	5	2 years	Household Budget Survey
Solomon Islands	2005	1	na	Household Income and Expenditure Survey
South Africa	2010	4	5 years	Income and Expenditure Survey
Sri Lanka	2006	3	4 years	Household Income and Expenditure Survey 2006-2007
St. Lucia	2005	1	na	Survey of Living Conditions/Household Budget Survey
Suriname	2001	2	2 years	Expenditure Household Survey (EHS)
Swaziland	2009	3	7 years	Household Income and Expenditure Survey
Tajikistan	2006	4	1 year	Household Budget Survey
Tanzania	2007	2	7 years	Tanzania Household Budget Survey
Togo	1996	1	na	Enquête sur les dépenses des ménages de Lomé
Tonga	2000	1	na	Household Income and Expenditure Survey
Tunisia	2000	2	5 years	Enquête Nationale sur le Budget, la Consommation et le Niveau de Vie des Ménages
Turkey	2006	6	1 year	Household Budget Survey (HBS)
Ukraine	2003	1	na	Ukrainian Household Living Condition Survey
Ukraine	2001	5	1 year	Household Budget Survey
Uruguay	2000	6	1 year	Encuesta Continua de Hogares (ECH) - Year
Uzbekistan	2003	2	3 years	Household Budget Survey

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Vanuatu	2006	2	8 years	Household Income and Expenditure Survey
Viet Nam	1999	3	2 years	Multi Purposes Household Survey
Westbank and Gaza	2007	6	2 years	Household Expenditure and Consumption Survey
Yemen	2005	2	7 years	Household Budget Survey
Zimbabwe	2007	4	3 years	Income, Consumption and Expenditure Survey
Zimbabwe	2004	2	9 years	Poverty Assessment Study Survey

[1] The interval period is based on the number of surveys between the first and last survey.

Table A4. Global Coverage and frequency of Integrated Survey (non-LSMS)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Afghanistan	2005	2	2 years	National Risk and Vulnerability Assessment
Albania	1998	1	na	Living Conditions Survey
Algeria	1995	1	na	Enquête Nationale sur la Mesure des Niveaux de Vie des Ménages Algériens
Angola	2008	1	na	Inquérito Integrado sobre o Bem-Estar da População - IBEP 2008-2009 (IDR II e MICS III)
Argentina	2004	2	7 years	Encuesta Complementaria de Pueblos Indígenas
Armenia	2007	8	1 year	Integrated Living Conditions Survey
Armenia	2006	1	na	Food Security and Poverty
Belarus	2007	2	1 year	Household Sample Survey
Belize	2002	2	7 years	Living Standard Measurement Survey
Bhutan	2003	1	na	Bhutan Living Standards Survey
Bolivia	2005	2	10 years	Encuesta de Hogares
Brazil	1999	4	1 year	Pesquisa Nacional por Amostra de Domicilios - September
Bulgaria	2003	1	na	Multitopic Household Survey
Cambodia	2009	5	3 years	Cambodia Socio-Economic Survey
Cape Verde	1999	2	1 year	Inquerito às Despesas e receitas Familiares
Cayman Islands	2007	1	na	National Assessment of Living Conditions
Central African Republic	1995	1	na	Enquête intégrale
Chile	2006	2	5 years	Encuesta Calidad de Vida
Chile	2003	4	2 years	Caracterizacion Socioeconomica Nacional
Colombia	2007	3	4 years	Encuesta Calidad de Vida - Bogotá
Colombia	2006	1	na	Gran Encuesta Integrada de Hogares
Comoros	2004	1	na	Enquête intégrale auprès des ménages
Côte d'Ivoire	2008	2	6 years	Enquête niveau de vie des ménages
Cyprus	2005	1	na	Survey on Houseold Income, Relative Poverty and Living Conditions
Czech Republic	2007	2	2 years	Living Conditions Survey
Dominica	2002	1	na	Survey of Living Conditions
Egypt, Arab Rep.	1999	2	2 years	Integrated Household Survey
El Salvador	2007	13	1 year	Encuesta de Hogares de Propositos Multiples
Equatorial Guinea	2006	1	na	Enquête equato-guinéenne auprès des Ménages
Gambia	2003	1	na	Integrated Household Survey
Gambia	1998	1	na	National Household Poverty Survey
Georgia	2006	1	na	Integrated Household and Labour Force Survey
Georgia	2002	1	na	National Survey of Households
Grenada	2007	1	na	Country Poverty Assessment
Guinea	2007	1	na	Questionnaire des Indicateurs de Base du Bien-être
Guinea	2002	1	na	Enquête intégrale sur le budget et l'évaluation de la pauvreté

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Guyana	1998	1	na	Guyana Living Standard Measurement Survey
Haiti	2001	1	na	Enquête sur les Conditions de Vie en Haïti (ECVH)
Honduras	2006	19	1 year	Encuesta Permanente de Hogares de Propósitos Múltiples
India	2005	10	1 year	National Sample Survey Round 61, 2004-2005
Iran, Islamic Rep.	1998	1	na	Socio-Economic Characteristics of Households
Iraq	2004	1	na	Iraq Living Conditions Survey
Jamaica	2007	2	1 year	Jamaica Survey of Living Conditions
Jordan	1995	1	na	Survey of Living Conditions
Kazakhstan	2000	1	na	Living condition survey of young families
Kenya	2005	1	na	Kenya Integrated Household Budget Survey
Kyrgyz Republic	1996	1	na	Employment and Welfare Survey
Latvia	2004	2	5 years	Living Conditions Survey
Lebanon	2004	1	na	National Survey of Household Living Conditions
Madagascar	2005	2	4 years	Enquêtes Périodiques auprès des Ménages
Malawi	2010	3	5 years	Third Integrated Household Survey
Malawi	2005	1	na	Welfare Monitoring Survey I
Maldives	2004	2	7 years	Vulnerability and Poverty Assessment Survey
Mali	2009	4	3 years	Enquête en Grappe a Indicateurs Multiples et de Dépenses des ménages
Mauritania	2008	3	6 years	Enquête Permanente sur les Conditions de Vie des ménages
Mauritius	2006	7	1 year	Continuous Multi Purpose Household Survey
Mexico	2005	2	3 years	Encuesta Nacional sobre los Niveles de Vida en los Hogares
Mongolia	2001	4	2 years	Living Standard Measurement Survey
Mongolia	1999	1	na	Household Survey
Morocco	2006	2	8 years	Enquête Nationale sur les Niveaux de Vie des Ménages
Mozambique	1996	1	na	National Household Survey/IAF
Niger	1995	1	na	Enquête permanente de conjoncture économique et sociale
Nigeria	2008	3	5 years	Harmonized Nigeria Living Standards Measurement Survey
Pakistan	2005	2	7 years	Household Integrated Economic Survey 2005-2006
Paraguay	2007	6	2 years	Encuesta Permanente de Hogares
Peru	2002	9	1 year	Enquesta Nacional de Hogares - 4th Quarter
Philippines	2004	2	2 years	Annual Poverty Indicators Survey
Poland	2003	1	na	Living Conditions Survey
Poland	1999	1	na	General Social Survey
Romania	2002	3	1 year	Living Conditions Survey
Romania	1998	1	na	Integrated Household Survey
Russian Federation	2005	4	1 year	Russian Longitudinal Measurement Survey Round XIV
Rwanda	2010	3	5 years	Enquête intégrale sur les conditions de vie des ménages (EICV III)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Senegal	2011	2	5 years	Enquête de Suivi de la Pauvreté au Sénégal II
Serbia and Montenegro	2003	1	na	Serbia Survey of Living Standards
Sierra Leone	2011	1	na	Sierra Leone Integrated Household Survey
Slovenia	2005	1	na	Survey on Living Conditions
South Africa	2008	1	na	Living Conditions Survey
South Africa	2007	7	1 year	General Household Survey
South Africa	1998	1	na	KwaZulu-Natal Income Dynamics Study
Sri Lanka	1999	1	na	Sri Lanka Integrated Survey
St. Lucia	2005	2	10 years	Survey of Living Conditions/Household Budget Survey
Timor-Leste	2006	1	na	Timor-Leste Survey of Living Standards
Tunisia	2000	2	5 years	Living Standards Survey
Turkey	1998	1	na	Denizli Panel Survey
Uganda	2009	2	4 years	Uganda National Household Survey IV
Ukraine	2003	1	na	Ukrainian Household Living Condition Survey
Uruguay	2006	1	na	Encuesta Nacional de Hogares Ampliada
Venezuela, RB	2006	1	na	Encuesta de Hogares por Muestreo - II Semester
Viet Nam	1999	1	na	Poverty Survey
Zambia	2010	6	4 years	Living Conditions Monitoring Survey VI

[1] The interval period is based on the number of surveys between the first and last survey.

Table A5. Global Coverage and frequency of Living Standards Measurement Survey (LSMS)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Albania	2005	5	1 year	Living Standards Measurement Study
Albania	1996	1	na	Employment and Welfare Survey
Armenia	1996	1	na	Armenia Household Budget Survey
Azerbaijan	1995	1	na	Azerbaijan Survey of Living Conditions
Bahamas	2001	1	na	Survey of Living Conditions
Bhutan	2007	1	na	Bhutan Living Standard Survey
Bosnia and Herzegovina	2004	4	1 year	Living Standards Survey
Brazil	1996	1	na	Pesquisa sobre Padroes de Vida
Bulgaria	2001	3	3 years	Integrated Household Survey
China	1995	1	na	China Living Standards Survey
Dominica	2002	1	na	Survey of Living Conditions
Ecuador	2006	5	3 years	Encuestas de Condiciones de Vida - 5th Round
Ghana	2005	5	7 years	Ghana Living Standards Survey 5
Guatemala	2006	2	6 years	Encuesta Nacional de Condiciones de Vida
India	1997	1	na	Survey of Living Conditions, Uttar Pradesh and Bihar
Jamaica	2004	10	1 year	Jamaica Survey of Living Conditions
Kazakhstan	1996	1	na	Living Standards Measurement Survey
Kyrgyz Republic	1998	4	1 year	Poverty Monitoring Survey IV
Mongolia	2005	1	na	Living Standard Survey
Mongolia	2002	1	na	Integrated Household Income and Expenditure Survey with Living Standards Measurement Survey
Nepal	2003	2	8 years	Living Standards Survey II
Nicaragua	2005	4	3 years	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida
Pakistan	2007	3	2 years	Pakistan Social and Living Standards Measurement Survey 2007-2008
Panama	2003	2	6 years	Living Standard Measurement Study
Peru	2007	4	1 year	Enquesta Nacional de Hogares (ENAHO)
Russian Federation	2002	11	1 year	Russian Longitudinal Measurement Survey Round XI
Serbia and Montenegro	2000	1	na	Kosovo, Living Standards Measurement Survey
Sierra Leone	2003	1	na	Sierra Leone Integrated Household Survey
Tajikistan	2007	3	4 years	Living Standards Measurement Survey
Timor-Leste	2001	1	na	Timor Living Standards Survey
Turkmenistan	1998	1	na	Living Standards Measurement Survey
Viet Nam	2006	4	2 years	Household Living Standards Survey
Zambia	2004	4	2 years	Living Conditions Monitoring Survey IV

[1] The interval period is based on the number of surveys between the first and last survey.

Table A6. Global Coverage and frequency of Multiple indicator Cluster Survey (MICS)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Afghanistan	2003	2	3 years	Multiple Indicator Cluster Survey
Albania	2005	2	5 years	Multiple Indicator Cluster Survey 3
Algeria	2006	2	5 years	Multiple Indicator Cluster Survey 3
Angola	2008	3	4 years	Inquérito Integrado sobre o Bem-Estar da População - IBEP 2008-2009 (IDR II e MICS III)
Azerbaijan	2000	1	na	Multiple Indicator Cluster Survey
Bangladesh	2006	2	6 years	Multiple Indicator Cluster Survey 3
Belarus	2005	1	na	Multiple Indicator Cluster Survey 3
Belize	2006	1	na	Multiple Indicator Cluster Survey 3
Bolivia	2000	1	na	Encuesta de múltiples indicadores por conglomerados
Bosnia and Herzegovina	2006	2	6 years	Multiple Indicator Cluster Survey 3
Botswana	2000	1	na	Multiple Indicator Cluster Survey
Burkina Faso	2006	2	10 years	Multiple Indicator Cluster Survey 3
Burundi	2005	2	5 years	Multiple Indicator Cluster Survey 3
Cameroon	2006	2	6 years	Multiple Indicator Cluster Survey 3
Central African Republic	2006	2	6 years	Multiple Indicator Cluster Survey 3
Chad	2000	1	na	Enquête par Grappes à Indicateurs Multiples
Comoros	2000	1	na	Enquête à Indicateurs Multiples
Congo, Dem. Rep.	2001	2	6 years	Enquête Nationale sur la Situation des Enfants et des Femmes
Côte d'Ivoire	2006	3	5 years	Enquête sur les Indicateurs Multiples
Cuba	2000	1	na	Multiple Indicator Cluster Survey
Djibouti	2006	1	na	Enquête Djiboutienne à Indicateurs Multiples
Dominican Rep.	2006	3	3 years	Encuesta Nacional de Hogares de Propósitos Múltiples
Egypt, Arab Rep.	1995	1	na	Multiple Indicator Cluster Survey
Gambia	2006	2	6 years	Multiple Indicator Cluster Survey 3
Georgia	2005	2	6 years	Multiple Indicator Cluster Survey 3
Ghana	2006	2	9 years	Multiple Indicator Cluster Survey 3
Guinea	1996	1	na	Enquête à Indicateurs Multiples
Guinea Bissau	2006	2	6 years	Multiple Indicator Cluster Survey 3
Guyana	2006	2	6 years	Multiple Indicator Cluster Survey 3
India	2000	1	na	Multiple Indicator Cluster Survey
Indonesia	2000	1	na	Mother and Child Education and Health Survey
Iraq	2006	1	na	Multiple Indicator Cluster Survey 3
Jamaica	2005	1	na	Multiple Indicator Cluster Survey 3
Kazakhstan	2006	1	na	Multiple Indicator Cluster Survey 3
Kenya	2005	2	5 years	Multiple Indicator Cluster Survey 3
Korea (Dem.Rep)	2000	2	2 years	Multiple Indicator Cluster Survey

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Kyrgyz Republic	2006	1	na	Multiple Indicator Cluster Survey 3
Lao PDR	2006	3	5 years	Multiple Indicator Cluster Survey 3
Lebanon	2006	2	6 years	Multiple Indicator Cluster Survey 3
Lesotho	2000	1	na	Multiple Indicator Cluster Survey
Liberia	1995	1	na	Multiple Indicator Cluster Survey
Macedonia, FYR	2005	1	na	Multiple Indicator Cluster Survey 3
Madagascar	2000	2	5 years	Enquête à Indicateurs Multiples
Malawi	2006	2	9 years	Multiple Indicator Cluster Survey
Maldives	2001	1	na	Multiple Indicator Cluster Survey
Mali	1996	1	na	Enquête à indicateurs Multiples
Mauritania	2007	2	12 years	Multiple Indicator Cluster Survey 3
Moldova	2000	1	na	Multiple Indicator Cluster Study
Mongolia	2005	2	5 years	Multiple Indicator Cluster Survey
Morocco	2006	1	na	Multiple Indicator Cluster Survey 3
Mozambique	2008	2	13 years	Multiple Indicator Cluster Surveys 3
Myanmar	2000	2	5 years	Multiple IndicatorsCluster Survey
Niger	2006	3	5 years	Enquête Démographique et de Santé et à Indicateurs Multiples
Nigeria	2007	2	7 years	Multiple Indicator Cluster Survey 3
Nigeria	2001	1	na	Food Consumption and Nutrition Survey
Philippines	2007	3	5 years	Multiple Indicator Cluster Survey 3
Rwanda	2000	1	na	Enquête à Indicateurs Multiples
São Tomé and Principe	2006	2	6 years	Multiple Indicator Cluster Survey 3
Senegal	2000	2	5 years	Enquête sur les Objectifs de la fin de la Décennie sur l'Enfance
Serbia and Montenegro	2005	3	5 years	Multiple Indicator Cluster Survey 3
Sierra Leone	2005	2	5 years	Multiple Indicator Cluster Survey 3
Somalia	2006	2	7 years	Multiple Indicator Cluster Survey 3
Sudan	2006	2	6 years	Multiple Indicator Cluster Survey 3
Suriname	2006	2	6 years	Multiple Indicator Cluster Survey 3
Swaziland	2000	1	na	Multiple Indicator Cluster Survey
Syrian Arab Republic	2006	3	5 years	Multiple Indicator Cluster Survey
Tajikistan	2005	3	2 years	Multiple Indicator Cluster Survey 3
Thailand	2005	1	na	Multiple Indicator Cluster Survey 3
Timor-Leste	2002	1	na	Multiple Indicator Cluster Survey
Togo	2006	2	6 years	Multiple Indicator Cluster Survey 3
Trinidad and Tobago	2006	2	6 years	Multiple Indicator Cluster Survey 3
Tunisia	2006	2	6 years	Multiple Indicator Cluster Survey 3
Turkmenistan	2006	1	na	Multiple Indicator Cluster Survey 3
Ukraine	2005	2	5 years	Multiple Indicator Cluster Survey 3
Uzbekistan	2006	2	6 years	Multiple Indicator Cluster Survey

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Vanuatu	2007	1	na	Multiple Indicator Cluster Survey 3
Venezuela, RB	2000	1	na	Multiple Indicator Cluster Survey
Viet Nam	2005	2	5 years	Multiple Indicator Cluster Survey 3
Westbank and Gaza	2006	1	na	Multiple Indicators Cluster Survey 3
Yemen	2006	1	na	Multiple Indicator Cluster Survey 3
Zambia	1995	1	na	Multiple Indicator Cluster Survey
Zimbabwe	2009	1	na	Multiple Indicator Monitoring Survey 2009

[1] The interval period is based on the number of surveys between the first and last survey.

Table A7. Global Coverage and frequency of Population and Housing Census (PHC)

Country	Latest survey	Survey name
Afghanistan	2004	Population and Housing Census, Phase 1
Albania	2001	Population and Housing Census
Algeria	1998	Population and Housing Census
Amer. Samoa	2000	Population and Housing Census
Anguilla	2001	Population and Housing Census
Antigua and Barbuda	2001	Population and Housing Census
Argentina	2001	Population and Housing Census
Armenia	2001	Population Census
Aruba	2000	Population and Housing Census
Azerbaijan	1999	Population and Housing Census
Bahamas	2000	Population and Housing Census
Bahrain	2001	Population and Housing Census
Bangladesh	2001	Population and Housing Census
Barbados	2000	Population and Housing Census
Belarus	1999	Population and Housing Census
Belize	2000	Population and Housing Census
Benin	2002	Population and Housing Census
Bermuda	2000	Population and Housing Census
Bhutan	2005	Population and Housing Census
Bolivia	2001	Population and Housing Census
Botswana	2001	Population and Housing Census
Brazil	2007	Population and Housing Census
Brunei	2001	Population and Housing Census
Bulgaria	2001	Population and Housing Census
Burkina Faso	2006	Population and Housing Census
Cambodia	2008	Population Census
Cameroon	2005	Recensement Général de la Population et de l'Habitat
Cape Verde	2000	Recenseamento Geral da Populacao e Habitacao
Cayman Islands	1999	Population and Housing Census
Central African Republic	2003	Population and Housing Census
Chile	2002	Population and Housing Census
China	2001	Population Census - Hong Kong Special Administrative Region
Colombia	2005	Censo General
Comoros	2003	Population and Housing Census
Congo, Rep.	2007	Recensement Général de la Population et de l'Habitation
Cook Isld.	2006	Population Census
Costa Rica	2000	Population and Housing Census
Côte d'Ivoire	1998	Recensement Général de la Population et de

Country	Latest survey	Survey name
		l'Habitat
Croatia	2001	Population and Housing Census
Cuba	2002	Population and Housing Census
Cyprus	2001	Population and Housing Census
Czech Republic	2001	Population and Housing Census
Djibouti	2009	Population and Housing Census
Dominica	2001	Population and Housing Census
Dominican Rep.	2002	Population and Housing Census
Ecuador	2001	Population and Housing Census
Egypt, Arab Rep.	2006	Census of Population, Housing and Establishments
Equatorial Guinea	2002	Population and Housing Census
Eritrea	2004	Sample Population Census
Estonia	2000	Population and Housing Census
Ethiopia	2007	Population and Housing Census
Fiji	2007	Population and Housing Census
French Guiana	1999	Population and Housing Census
Gabon	2003	Recensement général de la population et de l'habitat
Gambia	2003	Population and Housing Census
Georgia	2002	Population and Housing Census
Ghana	2000	Population and Housing Census
Grenada	2001	Population and Housing Census
Guadeloupe	1999	Population and Housing Census
Guam	2000	Population and Housing Census
Guatemala	2002	Population and Housing Census
Guinea	1996	Recensement général de la population et de l'habitat
Guyana	2002	Population and Housing Census
Haiti	2003	Population and Housing Census
Honduras	2001	XVI Censo de Poblacion e de Vivienda
Hungary	2001	Population and Housing Census
India	2001	Population and Housing Census
Indonesia	2000	Population and Housing Census
Iran, Islamic Rep.	2006	Population and Housing Census
Iraq	1997	Population and Housing Census
Israel	1995	Population and Housing Census
Jamaica	2001	Population and Housing Census
Jordan	2004	Sample Population Census
Kazakhstan	1999	Population and Housing Census
Kenya	2009	Population and Housing Census
Kiribati	2005	Population and Housing census
Korea (Rep.)	2000	Population and Housing Census
Kuwait	1995	Population and Housing Census

Country	Latest survey	Survey name
Kyrgyz Republic	2009	Population Census
Lao PDR	2005	Population Census
Latvia	2000	Population and Housing Census
Lesotho	2001	Population and Housing Census
Liberia	2003	Sample Population Census
Libya	2003	Sample Population Census
Lithuania	2001	Population and Housing Census
Macao, China	2001	Population and Housing Census - Macau
Macedonia, FYR	2001	Census (2001)
Malawi	2008	Population and Housing Census
Malaysia	2000	Population and Housing Census
Maldives	2006	Population and Housing Census
Mali	1998	Recensement général de la population et de l'habitat
Marshall Isld.	1999	Population and Housing Census
Martinique	1999	Population and Housing Census
Mauritania	2000	Recensement général de la population et de l'habitat
Mauritius	2000	Population and Housing Census
Mayotte	1997	Population and Housing Census
Mexico	2005	II Conteo de población y vivienda
Micronesia	2000	Population and Housing Census
Moldova	2004	Sample Population Census
Mongolia	2000	Population and Housing Census
Montserrat	2001	Population and Housing Census
Morocco	2004	Population and Housing Census
Mozambique	2007	Population and Housing Survey
N. Mariana Isld.	2000	Population and Housing Census
Namibia	2001	Population and Housing Census
Nauru	2002	Population and Housing Census
Nepal	2001	Population and Housing Census
Neth.Antilles	2001	Population and Housing Census
New Caledonia	1996	Population and Housing Census
Nicaragua	2005	VIII Censo de Población y IV de Vivienda
Niger	2001	Population and Housing Census
Nigeria	2006	Population and Housing Census
Oman	2003	General Census of Population, Housing & Establishments
Pakistan	1998	Population and Housing Census
Palau	2000	Population and Housing Census
Panama	2000	Population and Housing Census
Papua New Guinea	2000	National Census
Paraguay	2002	Censo Nacional de Población y Viviendas
Peru	2007	Population and Housing Census

Country	Latest survey	Survey name
Philippines	2007	Census of Population
Poland	2002	Population and Housing Census
Puerto Rico	2000	Population and Housing Census
Qatar	2004	Population and Housing Census
Romania	2002	Population and Housing Census
Russian Federation	2002	Population and Housing Census
Rwanda	2002	Recensement général de la Population et de l'Habitat
Samoa	2006	Census of Population and Housing
São Tomé and Principe	2001	Population and Housing Census
Senegal	2002	Population and Housing Census
Serbia and Montenegro	2003	Montenegro, Census 2003
Seychelles	2002	Population and Housing Census
Sierra Leone	2004	Population and Housing Census
Singapore	2000	Population and Housing Census
Slovak Republic	2001	Population and Housing Census
Slovenia	2002	Population and Housing Census
Solomon Islands	1999	Population and Housing Census
South Africa	2001	Population and Housing Census
Sri Lanka	2001	Population and Housing Census
St. Helena	1998	Population and Housing Census
St. Lucia	2001	Population and Housing Census
St. Vincent and Grenadines	2001	Population and Housing Census
St.Kitts and Nevis	2001	Population and Housing Census
Suriname	2003	Population and Housing Census
Swaziland	1997	Population and Housing Census
Syrian Arab Republic	2004	Population and Housing Census
China, Hong Kong	2001	Population and Housing Census - Hong Kong
Taiwan, China	2000	Population and Housing Census - Taiwan
Tajikistan	2000	Population and Housing Census
Tanzania	2002	Population and Housing Census
Thailand	2000	Population and Housing Census
Timor-Leste	2004	Population Census
Tonga	1996	Population and Housing Census
Trinidad and Tobago	2000	Population and Housing Census
Tunisia	2004	Population and Housing Census
Turkey	2000	Population and Housing Census
Turkmenistan	1999	Microcensus
Turks and Caicos Isld.	2001	Population and Housing Census
Tuvalu	2002	Population and Housing Census
U.A.Emirates	2005	Population and Housing Survey
Uganda	2002	Uganda Population Census
Ukraine	2001	Population and Housing Census

Country	Latest survey	Survey name
Uruguay	2004	Censo Fase I
Uzbekistan	2001	Census (2001)
Vanuatu	1999	Population and Housing Census
Venezuela, RB	2001	XIII Censo General de Poblacion y Vivienda
Viet Nam	1999	Population and Housing Census
Virgin Isld. (British)	2001	Population and Housing Census
Virgin Isld. (US)	2000	Population and Housing Census
Wallis and Futuna Isld.	1996	Population and Housing Census
Westbank and Gaza	2007	Population and Housing Census
Yemen	2005	Population and Housing Census
Zambia	2000	Census of Population and Housing
Zimbabwe	2002	Population and Housing Census

Table A8. Global Coverage and frequency of Priority Survey (World Bank)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Angola	1995	1	na	Inquerito Prioritario Sobre as Condicoes de Vida dos Domicilios
Burkina Faso	2009	2	6 years	Enquête burkinabé sur les conditions de vie des ménages
Burundi	1998	1	na	Enquête prioritaire - Etude nationale sur les conditions de vie des populations
Cameroon	2001	2	5 years	Enquête Camerounaise Auprès des Ménages II
Central African Republic	2003	1	na	Enquête sur les Conditions de Vie en milieu rural
Chad	2002	2	7 years	Enquête sur la Consommation et le Secteur informel au Tchad 2002
Côte d'Ivoire	1998	1	na	Enquête prioritaire
Côte d'Ivoire	1995	1	na	Enquête sur le Niveau de Vie
Djibouti	2002	2	6 years	Enquête Djiboutienne auprès des Ménages II
Egypt, Arab Rep.	1997	1	na	Socio-Economic Impact of Structural Adjustment: Priority and Community Surveys II
Eritrea	1997	1	na	Eritrea household health status, utilization and expenditure survey
Ethiopia	2004	2	7 years	Welfare Monitoring Survey
Ethiopia	1998	1	na	Welfare Monitoring and Income Expenditure Survey
Georgia	2000	1	na	Internally Displaced Persons
Kenya	1997	1	na	Welfare Monitoring Survey III
Madagascar	1999	2	2 years	Enquête prioritaire auprès des ménages
Mali	1995	1	na	Enquete Agricole de conjoncture 1995
Mauritius	2005	1	na	Continuous Multi Purpose Household Survey
Niger	2005	1	na	Enquête nationale sur les conditions de vie des ménages
Nigeria	2006	1	na	General Household Survey
São Tomé and Principe	2000	1	na	Enquête sur les Conditions de Vie des Ménages
Uganda	2002	2	3 years	Uganda National Household Survey II
Uganda	1999	3	2 years	National Household Survey III
Uganda	1995	1	na	Welfare Monitoring Survey III
Zambia	1998	2	2 years	Living Conditions Monitoring Survey II

[1] The interval period is based on the number of surveys between the first and last survey.

Table A9. Global Coverage and frequency of Socio-Economic Monitoring Survey (SEMS)

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name
Azerbaijan	1999	1	na	Azerbaijan Study of People's Priorities
Bangladesh	1999	1	na	Poverty Monitoring Survey
Bhutan	1995	1	na	Socio-Economic Survey
Cambodia	2007	1	na	Cambodia Socio-Economic Survey
Chile	2006	1	na	Encuesta de Caracterización Socioeconómica Nacional
Ethiopia	2009	1	na	Welfare Monitoring Survey
Indonesia	2009	15	1 year	National Socio-Economic Survey
Iraq	2006	1	na	Iraq Household Socio Economic Survey
Malawi	2009	4	1 year	Welfare Monitoring Survey V
Marshall Isld.	2006	1	na	Community and Socio-Economic Survey
Mongolia	2007	1	na	Household Socio-Economic Survey 2007-2008
Nepal	2000	1	na	Between Census Household Information, Monitoring and Evaluation System
Niger	2006	1	na	Enquête sur la Conjoncture et la Vulnérabilité des Ménages
Philippines	1998	1	na	Annual Poverty Indicator Survey (APIS)
Rwanda	1996	1	na	Enquete Socio Demographique
Somalia	2002	1	na	Socio Economic Survey
South Africa	2007	1	na	Community Survey
Tajikistan	2002	1	na	Poverty Reduction Monitoring Survey
Thailand	2006	5	3 years	Household Socio-Economic Survey

[1] The interval period is based on the number of surveys between the first and last survey.

Table A10. Surveys since 2005, by country

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Afghanistan	2005	2	2 years	National Risk and Vulnerability Assessment	Integrated
Albania	2007	3	5 years	Household Budget Survey	IE
Albania	2005	5	1 year	Living Standards Measurement Study	LSMS
Albania	2005	2	5 years	Multiple Indicator Cluster Survey 3	MICS
Algeria	2006	2	5 years	Multiple Indicator Cluster Survey 3	MICS
Angola	2008	2	8 years	IncoInquérito Integrado sobre o Bem-Estar da	IE
Angola	2008	1	na	Inquérito Integrado sobre o Bem-Estar da População - IBEP 2008-2009 (IDR II e MICS III)	Integrated
Angola	2008	3	4 years	Inquérito Integrado sobre o Bem-Estar da População - IBEP 2008-2009 (IDR II e MICS III)	MICS
Armenia	2007	8	1 year	Integrated Living Conditions Survey	Integrated
Armenia	2006	1	na	Food Security and Poverty	Integrated
Armenia	2005	2	5 years	Demographic and Health Survey	DHS
Azerbaijan	2006	1	na	Demographic and Health Survey	DHS
Azerbaijan	2005	5	1 year	Household Budget Survey	IE
Bangladesh	2007	5	3 years	Demographic and Health Survey	DHS
Bangladesh	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Bangladesh	2005	3	5 years	Household Income and Expenditure Survey	IE
Belarus	2007	13	1 year	Income and Expenditure Survey (HHS)	IE
Belarus	2007	2	1 year	Household Sample Survey	Integrated
Belarus	2005	1	na	Multiple Indicator Cluster Survey 3	MICS
Belize	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
Benin	2006	3	5 years	Demographic and Health Survey	DHS
Bhutan	2007	1	na	Bhutan Living Standard Survey	LSMS
Bhutan	2005			Population and Housing Census	Census
Bolivia	2005	2	10 years	Encuesta de Hogares	Integrated
Bosnia and Herzegovina	2007	2	3 years	Household Budget Survey	IE
Bosnia and Herzegovina	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Botswana	2009	2	7 years	Household Income Expenditure Survey IV	IE
Brazil	2007	7	1 year	Pesquisa Nacional por Amostra de Domicílios	IE
Brazil	2007			Population and Housing Census	Census
Bulgaria	2007	6	1 year	Household Budget Survey	IE
Burkina Faso	2009	4	2 years	Enquête burkinabé sur les conditions de vie des ménages	CWIQ
Burkina Faso	2009	3	6 years	Enquête burkinabé sur les conditions de vie des ménages	Priority
Burkina Faso	2006	2	10 years	Multiple Indicator Cluster Survey 3	MICS

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Burkina Faso	2006			Population and Housing Census	Census
Burundi	2006	1	na	Questionnaire des Indicateurs de Base du Bien-Etre	CWIQ
Burundi	2005	2	5 years	Multiple Indicator Cluster Survey 3	MICS
Cambodia	2009	5	3 years	Cambodia Socio-Economic Survey	Integrated
Cambodia	2008			Population Census	Census
Cambodia	2005	3	3 years	Demographic and Health Survey	DHS
Cameroon	2007	2	7 years	Enquete Camerounaise Aupres des Menages III	IE
Cameroon	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Cameroon	2005			Recensement Général de la Population et de l'Habitat	Census
Cape Verde	2007	1	na	Questionário Unificado de Indicadores Básicos de Bem-Estar	CWIQ
Cayman Islands	2007	1	na	National Assessment of Living Conditions	Integrated
Central African Republic	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Chile	2006	2	5 years	Encuesta Calidad de Vida	Integrated
Chile	2006	1	na	Encuesta de Caracterización Socioeconómica Nacional	SEMS
Colombia	2007	3	4 years	Encuesta Calidad de Vida - Bogotá	Integrated
Colombia	2006	1	na	Gran Encuesta Integrada de Hogares	Integrated
Colombia	2005			Censo General	Census
Congo, Dem. Rep.	2007	1	na	Demographic and Health Survey	DHS
Congo, Rep.	2007			Recensement Général de la Population et de l'Habitation	Census
Congo, Rep.	2005	1	na	Enquête Congolaise auprès des ménages pour l'évaluation de la pauvreté	CWIQ
Congo, Rep.	2005	1	na	Demographic and Health Survey	DHS
Cook Isld.	2006			Population Census	Census
Côte d'Ivoire	2008	2	6 years	Enquête niveau de vie des ménages	Integrated
Côte d'Ivoire	2006	3	5 years	Enquête sur les Indicateurs Multiples	MICS
Côte d'Ivoire	2005	2	7 years	AIDS Indicator Survey	DHS
Croatia	2006	7	1 year	Household Budget Survey	IE
Cyprus	2005	1	na	Survey on Houseold Income, Relative Poverty and Living Conditions	Integrated
Czech Republic	2007	2	2 years	Living Conditions Survey	Integrated
Czech Republic	2006	2	8 years	Household Budget Survey	IE
Djibouti	2009			Population and Housing Census	Census

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Djibouti	2006	1	na	Enquête Djiboutienne à Indicateurs Multiples	MICS
Dominican Rep.	2007	4	3 years	Demographic and Health Survey	DHS
Dominican Rep.	2006	2	8 years	Encuesta Nacional de Ingresos y Gastos de los Hogares	IE
Dominican Rep.	2006	3	3 years	Encuesta Nacional de Hogares de Propósitos Múltiples	MICS
Ecuador	2006	5	3 years	Encuestas de Condiciones de Vida - 5th Round	LSMS
Egypt, Arab Rep.	2008	7	3 years	Demographic and Health Surveys	DHS
Egypt, Arab Rep.	2006			Census of Population, Housing and Establishments	Census
Egypt, Arab Rep.	2005	3	5 years	Household Budget Survey	IE
El Salvador	2007	13	1 year	Encuesta de Hogares de Propositos Multiples	Integrated
Equatorial Guinea	2006	1	na	Enquête equato-guinéenne auprès des Ménages	Integrated
Ethiopia	2010	4	5 years	Household Income, Consumption and Expenditure Survey	IE
Ethiopia	2009	1	na	Welfare Monitoring Survey	SEMS
Ethiopia	2007			Population and Housing Census	Census
Ethiopia	2005	2	5 years	Demographic and Health Survey	DHS
Fiji	2007			Population and Housing Census	Census
Gabon	2005	1	na	Enquête Gabonaise pour l'Evaluation et le Suivi de la Pauvreté	CWIQ
Gabon	2005	2	5 years	Enquête Gabonaise pour l'Evaluation et le Suivi de la Pauvreté	IE
Gambia	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Georgia	2007	12	1 year	Household Budget Survey (HBS)	IE
Georgia	2006	1	na	Integrated Household and Labour Force Survey	Integrated
Georgia	2005	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Ghana	2008	3	5 years	Demographic and Health Survey	DHS
Ghana	2006	2	9 years	Multiple Indicator Cluster Survey 3	MICS
Ghana	2005	5	7 years	Ghana Living Standards Survey 5	LSMS
Grenada	2007	1	na	Country Poverty Assessment	Integrated
Guatemala	2006	2	6 years	Encuesta Nacional de Condiciones de Vida	LSMS
Guinea	2007	2	5 years	Questionnaire des Indicateurs de Base du Bien-être	CWIQ
Guinea	2007	1	na	Questionnaire des Indicateurs de Base du Bien-être	Integrated
Guinea	2005	2	6 years	Demographic and Health Survey	DHS
Guinea Bissau	2010	2	8 years	Inquérito Ligeiro para Avaliação da Pobreza II	CWIQ

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Guinea Bissau	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Guyana	2007	1	na	Household Budget Survey	IE
Guyana	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Guyana	2005	1	na	AIDS Indicator Survey	DHS
Haiti	2005	2	5 years	Demographic and Health Survey	DHS
Honduras	2006	19	1 year	Encuesta Permanente de Hogares de Propósitos Múltiples	Integrated
Honduras	2005	1	na	Demographic and Health Survey	DHS
India	2005	2	7 years	National Family Health Survey III	DHS
India	2005	10	1 year	National Sample Survey Round 61, 2004-2005	Integrated
Indonesia	2009	15	1 year	National Socio-Economic Survey	SEMS
Indonesia	2007	3	5 years	Demographic and Health Survey	DHS
Iran, Islamic Rep.	2006	1	na	Households Expenditure and Income Survey	IE
Iran, Islamic Rep.	2006			Population and Housing Census	Census
Iraq	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
Iraq	2006	1	na	Iraq Household Socio Economic Survey	SEMS
Iraq	2005	1	na	Iraq Rapid Household Budget Survey	IE
Jamaica	2007	2	1 year	Jamaica Survey of Living Conditions	Integrated
Jamaica	2005	1	na	Multiple Indicator Cluster Survey 3	MICS
Jordan	2007	3	5 years	Demographic and Health Survey	DHS
Jordan	2006	3	4 years	Household Income and Expenditure Survey	IE
Kazakhstan	2007	10	1 year	Household Budget Survey (HBS)	IE
Kazakhstan	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
Kenya	2009			Population and Housing Census	Census
Kenya	2008	5	2 years	Demographic and Health Survey - IV 2008-2009	DHS
Kenya	2005	1	na	Kenya Integrated Household Budget Survey	Integrated
Kenya	2005	2	5 years	Multiple Indicator Cluster Survey 3	MICS
Kiribati	2006	1	na	Household Income and Expenditure Survey	IE
Kiribati	2005			Population and Housing census	Census
Kyrgyz Republic	2009			Population Census	Census
Kyrgyz Republic	2007	11	1 year	Household Budget Survey (HBS)	IE
Kyrgyz Republic	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
Lao PDR	2007	4	5 years	Expenditure and Consumption Survey 2007-2008	IE
Lao PDR	2006	3	5 years	Multiple Indicator Cluster Survey 3	MICS
Lao PDR	2005			Population Census	Census
Lebanon	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Liberia	2010	2	3 years	Core Welfare Indicator Questionnaire	CWIQ
Liberia	2009	2	2 years	Liberia Malaria Indicator Survey	DHS
Liberia	2007	1	na	Core Welfare Indicators Questionnaire	IE
Lithuania	2007	12	1 year	Survey on Income and Living Conditions	IE
Macedonia, FYR	2006	10	1 year	Household Budget Survey (HBS)	IE
Macedonia, FYR	2005	1	na	Multiple Indicator Cluster Survey 3	MICS
Madagascar	2005	2	4 years	Enquêtes Périodiques auprès des Ménages	Integrated
Malawi	2010	3	5 years	Third Integrated Household Survey	Integrated
Malawi	2009	4	1 year	Welfare Monitoring Survey V	SEMS
Malawi	2008			Population and Housing Census	Census
Malawi	2006	2	9 years	Multiple Indicator Cluster Survey	MICS
Malawi	2005	1	na	Welfare Monitoring Survey I	Integrated
Malaysia	2007	3	4 years	Household Income/Basic Amenities Survey	IE
Maldives	2006			Population and Housing Census	Census
Mali	2009	4	3 years	Enquête en Grappe a Indicateurs Multiples et de Dépenses des ménages	Integrated
Mali	2006	3	5 years	Demographic and Health Survey	DHS
Marshall Isld.	2007	1	na	Demographic and Health Survey	DHS
Marshall Isld.	2006	1	na	Community and Socio-Economic Survey	SEMS
Mauritania	2008	2	4 years	Enquête Permanente sur les Conditions de Vie des ménages	CWIQ
Mauritania	2008	3	6 years	Enquête Permanente sur les Conditions de Vie des ménages	Integrated
Mauritania	2007	2	12 years	Multiple Indicator Cluster Survey 3	MICS
Mauritius	2006	2	5 years	Household Budget Survey	IE
Mauritius	2006	7	1 year	Continuous Multi Purpose Household Survey	Integrated
Mauritius	2005	1	na	Continuous Multi Purpose Household Survey	Priority
Mexico	2006	7	2 years	Encuesta Nacional de Ingresos y Gastos de los Hogares	IE
Mexico	2005	2	3 years	Encuesta Nacional sobre los Niveles de Vida en los Hogares	Integrated
Mexico	2005			II Conteo de población y vivienda	Census
Micronesia	2005	1	na	Household Income and Expenditure Survey	IE
Moldova	2008	12	1 year	Household Budget Survey	IE
Moldova	2005	1	na	Demographic and Health Survey	DHS
Mongolia	2007	1	na	Household Socio-Economic Survey 2007-2008	SEMS
Mongolia	2005	4	3 years	Household Income and Expenditure Survey	IE
Mongolia	2005	1	na	Living Standard Survey	LSMS

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Mongolia	2005	2	5 years	Multiple Indicator Cluster Survey	MICS
Morocco	2006	2	8 years	Enquête Nationale sur les Niveaux de Vie des Ménages	Integrated
Morocco	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
Morocco	2005	3	5 years	Demographic and Health Survey	DHS
Mozambique	2008	2	6 years	Inquérito Sobre Orçamento Familiar	IE
Mozambique	2008	2	13 years	Multiple Indicator Cluster Surveys 3	MICS
Mozambique	2007			Population and Housing Survey	Census
Myanmar	2006	3	5 years	Household Income and Expenditure Survey	IE
Namibia	2006	2	6 years	Demographic and Health Survey	DHS
Nepal	2006	3	5 years	Demographic and Health Survey	DHS
Nicaragua	2006	3	5 years	Encuesta Nicaragüense de Demografía y Salud	DHS
Nicaragua	2005	4	3 years	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida	LSMS
Nicaragua	2005			VIII Censo de Población y IV de Vivienda	Census
Niger	2007	2	9 years	Enquête Nationale sur le Budget et la Consommation des Menages	IE
Niger	2006	2	8 years	Demographic and Health Survey	DHS
Niger	2006	3	5 years	Enquête Démographique et de Santé et à Indicateurs Multiples	MICS
Niger	2006	1	na	Enquête sur la Conjoncture et la Vulnérabilité des Ménages	SEMS
Niger	2005	2	na	Enquête nationale sur les conditions de vie des ménages	CWIQ
Niger	2005	1	na	Enquête nationale sur les conditions de vie des ménages	Priority
Nigeria	2008	4	4 years	Demographic and Health Survey	DHS
Nigeria	2008	3	5 years	Harmonized Nigeria Living Standards Measurement Survey	Integrated
Nigeria	2007	2	7 years	Multiple Indicator Cluster Survey 3	MICS
Nigeria	2006	4	2 years	Core Welfare Indicators Questionnaire Survey	CWIQ
Nigeria	2006			Population and Housing Census	Census
Nigeria	2006	1	na	General Household Survey	Priority
Pakistan	2007	3	2 years	Pakistan Social and Living Standards Measurement Survey 2007-2008	LSMS
Pakistan	2006	1	na	Demographic and Health Survey	DHS
Pakistan	2005	2	7 years	Household Integrated Economic Survey 2005-2006	Integrated
Papua New Guinea	2005	2	9 years	Household Income and Expenditure Survey	IE
Paraguay	2007	6	2 years	Encuesta Permanente de Hogares	Integrated

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Peru	2007	4	1 year	Enquesta Nacional de Hogares (ENAHO)	LSMS
Peru	2007			Population and Housing Census	Census
Philippines	2008	3	5 years	National Demographic and Health Survey	DHS
Philippines	2007	3	5 years	Multiple Indicator Cluster Survey 3	MICS
Philippines	2007			Census of Population	Census
Philippines	2006	5	3 years	Family Income and Expenditure Survey	IE
Poland	2006	9	1 year	Household Budget Survey	IE
Romania	2007	6	1 year	Household Budget Survey (HBS)	IE
Russian Federation	2007	11	1 year	Household Budget Survey (HBS)	IE
Russian Federation	2005	4	1 year	Russian Longitudinal Measurement Survey Round XIV	Integrated
Rwanda	2010	3	5 years	Enquête intégrale sur les conditions de vie des ménages (EICV III)	Integrated
Rwanda	2007	3	3 years	Interim Demographic and Health Survey	DHS
Samoa	2006			Census of Population and Housing	Census
São Tomé and Principe	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Senegal	2011	2	5 years	Enquête de Suivi de la Pauvreté au Sénégal II	Integrated
Senegal	2005	3	4 years	Enquête Démographique et de Santé	DHS
Serbia and Montenegro	2008	8	1 year	Household Budget Survey (HBS)	IE
Serbia and Montenegro	2005	3	5 years	Multiple Indicator Cluster Survey 3	MICS
Seychelles	2006	2	7 years	Household Budget Survey	IE
Sierra Leone	2011	1	na	Sierra Leone Integrated Household Survey	Integrated
Sierra Leone	2008	1	na	Demographic and Health Survey	DHS
Sierra Leone	2007	1	na	Core Welfare Indicators Questionnaire	CWIQ
Sierra Leone	2005	2	5 years	Multiple Indicator Cluster Survey 3	MICS
Slovenia	2005	5	2 years	Household Budget Survey	IE
Slovenia	2005	1	na	Survey on Living Conditions	Integrated
Solomon Islands	2006	1	na	Demographic and Health Survey	DHS
Solomon Islands	2005	1	na	Household Income and Expenditure Survey	IE
Somalia	2006	2	7 years	Multiple Indicator Cluster Survey 3	MICS
South Africa	2010	4	5 years	Income and Expenditure Survey	IE
South Africa	2008	1	na	Living Conditions Survey	Integrated
South Africa	2007	7	1 year	General Household Survey	Integrated
South Africa	2007	1	na	Community Survey	SEMS
Sri Lanka	2006	1	na	Demographic and Health Survey	DHS
Sri Lanka	2006	3	4 years	Household Income and Expenditure Survey 2006-2007	IE

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
St. Lucia	2005	1	na	Survey of Living Conditions/Household Budget Survey	IE
St. Lucia	2005	2	10 years	Survey of Living Conditions/Household Budget Survey	Integrated
Sudan	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Suriname	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Swaziland	2009	3	7 years	Household Income and Expenditure Survey	IE
Swaziland	2006	1	na	Demographic and Health Survey	DHS
Syrian Arab Republic	2006	3	5 years	Multiple Indicator Cluster Survey	MICS
Tajikistan	2007	3	4 years	Living Standards Measurement Survey	LSMS
Tajikistan	2006	4	1 year	Household Budget Survey	IE
Tajikistan	2005	3	2 years	Multiple Indicator Cluster Survey 3	MICS
Tanzania	2007	6	2 years	AIDS Indicator Survey	DHS
Tanzania	2007	2	7 years	Tanzania Household Budget Survey	IE
Thailand	2006	5	3 years	Household Socio-Economic Survey	SEMS
Thailand	2005	1	na	Multiple Indicator Cluster Survey 3	MICS
Timor-Leste	2006	1	na	Timor-Leste Survey of Living Standards	Integrated
Togo	2011	2	5 years	Questionnaire Des indicateurs Base Du Bien-Etre	CWIQ
Togo	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Trinidad and Tobago	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Tunisia	2006	2	6 years	Multiple Indicator Cluster Survey 3	MICS
Turkey	2006	6	1 year	Household Budget Survey (HBS)	IE
Turkmenistan	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
U.A.Emirates	2005			Population and Housing Survey	Census
Uganda	2009	2	4 years	Uganda National Household Survey IV	Integrated
Uganda	2006	4	6 years	Demographic and Health Survey	DHS
Ukraine	2007	1	na	Demographic and Health Survey	DHS
Ukraine	2005	2	5 years	Multiple Indicator Cluster Survey 3	MICS
Uruguay	2006	1	na	Encuesta Nacional de Hogares Ampliada	Integrated
Uzbekistan	2006	2	6 years	Multiple Indicator Cluster Survey	MICS
Vanuatu	2007	1	na	Multiple Indicator Cluster Survey 3	MICS
Vanuatu	2006	2	8 years	Household Income and Expenditure Survey	IE
Venezuela, RB	2006	1	na	Encuesta de Hogares por Muestreo - II Semester	Integrated
Viet Nam	2006	4	2 years	Household Living Standards Survey	LSMS
Viet Nam	2005	3	4 years	AIDS Indicator Survey	DHS
Viet Nam	2005	2	5 years	Multiple Indicator Cluster Survey 3	MICS

Country	Latest survey	Surveys since 1995	Usual interval period	Survey name	Survey category
Westbank and Gaza	2007	6	2 years	Household Expenditure and Consumption Survey	IE
Westbank and Gaza	2007			Population and Housing Census	Census
Westbank and Gaza	2006	1	na	Multiple Indicators Cluster Survey 3	MICS
Yemen	2006	1	na	Multiple Indicator Cluster Survey 3	MICS
Yemen	2005	2	7 years	Household Budget Survey	IE
Yemen	2005			Population and Housing Census	Census
Zambia	2010	6	4 years	Living Conditions Monitoring Survey VI	Integrated
Zambia	2007	3	6 years	Demographic and Health Survey	DHS
Zimbabwe	2009	1	na	Multiple Indicator Monitoring Survey 2009	MICS
Zimbabwe	2007	4	3 years	Income, Consumption and Expenditure Survey	IE
Zimbabwe	2005	2	6 years	Demographic and Health Survey	DHS

[1] The interval period is based on the number of surveys between the first and last survey.

Annex B. Existing WSH financial flow studies by country

(from Tremolet 2011, GLAAS / WHO)

Lead agency	**WHO**	**OECD**	**WSP**	**AMCOW/ WSP**	**World Bank**	**World Bank**	**IRC**	**WaterAid**
Name of initiative	**GLAAS**	**Strategic Financial Planning**	**Resource Flows Assessment**	**Country Sector Overviews**	**AICD**	**PER (since 2002)**	**WASH-Cost project**	**Various initiatives[27]**
Sub-Saharan Africa								
Angola	2010			2010	2009			
Benin	2010			2006, 2010	2005	FY04		
Botswana					2009			
Burkina Faso	2010			2006, 2010	2005	FY08	(2008-2012)	2010 WW
Burundi	2010			2010				
Cameroon	2010			2010	2005	FY09		
Central African Republic	2010			2010	2009	FY10		
Cape Verde					2005	FY06, FY08		
Chad	2010			2010	2005			
Congo, Brazzaville				2010	2009	FY10		
Dem. Rep. of Congo	2010			2006, 2010	2005	FY10		
Côte d'Ivoire	2010			2010	2005	FY09		
Ethiopia	2010		2004 (only water)	2006, 2010	2005	FY04, FY08, FY09		2005 WSA, 2009 LLF, 2010 BT

[27] LLF = Study on Local Level Financing ; PFS = Public Funding for Sanitation ; WSA = Water Sector Assessments ; WW = WASHwatch ; BT = Budget Tracking

Lead agency	WHO	OECD	WSP	AMCOW/ WSP	World Bank	World Bank	IRC	WaterAid
Name of initiative	**GLAAS**	**Strategic Financial Planning**	**Resource Flows Assessment**	**Country Sector Overviews**	**AICD**	**PER (since 2002)**	**WASH-Cost project**	**Various initiatives[27]**
Gabon					2009			
The Gambia				2010				
Ghana	2008, 2010			2006, 2010	2005	FY08	(2008-2012)	2006 WSA, 2009 LLF
Kenya	2010		2004	2006, 2010	2005			
Liberia				2010	2009			
Lesotho	2010	2009			2005			
Madagascar	2008, 2010			2006, 2010	2005	FY07		2005 WSA, 2009 LLF
Malawi				2006, 2010	2005			
Mali	2010			2010	2009	FY08		2010 WW
Mauritania	2010			2006, 2010	2009			
Mauritius					2009			
Mozambique	2010			2006, 2010	2005	FY03, FY09	(2008-2012)	2005 WSA
Namibia					2005			
Niger	2010			2006, 2010	2005	FY09		
Nigeria				2010	2005	FY08 + FY09 (local)		2006 WSA, 2009 LLF
Rwanda	2010			2006, 2010	2005	MLEFWM, 2006		
Senegal	2010			2006, 2010	2005			
Sierra Leone	2010			2010	2009	FY10		

Lead agency	WHO	OECD	WSP	AMCOW/ WSP	World Bank	World Bank	IRC	WaterAid
Name of initiative	**GLAAS**	**Strategic Financial Planning**	**Resource Flows Assessment**	**Country Sector Overviews**	**AICD**	**PER (since 2002)**	**WASH-Cost project**	**Various initiatives[27]**
South Africa	2010		2004	2010	2005			
Sudan	2010			2010	2005			
Swaziland					2009			
Tanzania	2010			2006, 2010	2005	FY03, FY04, FY09		2005 WSA, 2010 PFS (Dar Es Salaam)
Togo	2010			2010		FY10		
Uganda	2008, 2010		2004 (only sanitation)	2006, 2010	2005	FY03		2005 WSA, 2009 LLF, 2010 WW
Zambia			2004	2006, 2010	2005			
Zimbabwe	2010			2010	2009			
MENA								
Algeria						FY07		
Egypt		2009				FY06		
Libya						FY09		
Jordan						FY05		
Morocco	2010							
Oman	2010							
Europe and Central Asia								
Albania						FY07, FY08		
Armenia		2008				FY07		

Lead agency	WHO	OECD	WSP	AMCOW/ WSP	World Bank	World Bank	IRC	WaterAid
Name of initiative	**GLAAS**	**Strategic Financial Planning**	**Resource Flows Assessment**	**Country Sector Overviews**	**AICD**	**PER (since 2002)**	**WASH-Cost project**	**Various initiatives[27]**
Bulgaria		2008				FY06		
Georgia		2008						
Kazakhstan	2008, 2010	2008						
Kyrgyz Republic		2008						
Moldova		2008						
Turkey		2008						
Russian Federation		2008						
Ukraine		2008						
East Asia and Pacific								
Cambodia	2010	2008						
China		2008						
Indonesia	2010					FY07		
Laos	2010							
Mongolia	2008, 2010							
Philippines	2010					FY07		
Viet Nam	2008, 2010							
Thailand	2010							2010 PFS
Timor Leste	2010							
Latin America and Caribbean								

Lead agency	WHO	OECD	WSP	AMCOW/ WSP	World Bank	World Bank	IRC	WaterAid
Name of initiative	**GLAAS**	**Strategic Financial Planning**	**Resource Flows Assessment**	**Country Sector Overviews**	**AICD**	**PER (since 2002)**	**WASH-Cost project**	**Various initiatives[27]**
Dominican Republic						FY03		
Ecuador						FY04		
El Salvador						FY04		
Honduras	2010							
Mexico						FY04, FY05, FY06		
Nicaragua						FY07		
Panama						FY06		
Paraguay	2010							
South Asia								
Bangladesh	2010							2006 WSA
India							(2008-2012)	2010 PFS (Bihar)
Nepal	2008, 2010							2009 LLF, 2010 WW
Pakistan						FY03		