Febriant Abby/USAID IUWASH PLUS

TRACKING IMPACT FOR POOR AND VULNERABLE HOUSEHOLDS

The USAID Indonesia Urban Water, Sanitation and Hygiene '*Penyehatan Lingkungan Untuk Semua*' (IUWASH PLUS) project is a five-year, $39.6 million initiative designed to assist the Government of Indonesia in increasing access to water supply and sanitation services as well as improving key hygiene behaviors among urban poor and vulnerable populations. Implemented by DAI Global LLC (under USAID contract AID-497-TO-16-00003), USAID IUWASH PLUS works with governmental and donor agencies, the private sector, NGOs, communities and others to strength the urban water, sanitation, and hygiene (WASH) ecosystem.

An important objective of the USAID IUWASH PLUS project is to expand and improve the quality of WASH services specifically for the poorest and most vulnerable households specifically those that fall into one of the bottom two quintiles of the population in terms of wealth and which are broadly referred to as the "bottom 40%" (or "B40"). The project takes this mandate very seriously, and therefore seeks to verify the socioeconomic status of its beneficiaries.

A seemingly simplistic task, the determination of who is "poor", however, represents a complex undertaking. For one, poverty is, in and of itself, an abstract term subject to different interpretations. Even after a definition is agreed upon, however, the gathering of data on the poor—not to mention their access to different types of water and sanitation services—is a formidable task. In response, many programs opt to employ simple indicators of wealth such as electrical consumption. Though easier to collect related data, the use of such single measures can lead to less accurate results and does not allow for comparison with national wealth classification programs.

Recognizing all approaches to wealth classification have inherent limitations and imperfections, the USAID IUWASH PLUS Project undertook a comparison of different methodologies for estimating

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socioeconomic status. An important requirement was that results of the selected methodology should align closely with results of the government's National Poverty Reduction Program (TNP2K).

Following a comparison of options, USAID IUWASH PLUS selected the wealth categorization methodology employed by the USAID-supported Demographic and Health Surveys (DHS) Program. The DHS Wealth Index offered several advantages:

- The methodology is well-known by the TNP2K program and accepted as international best practice and it has been widely tested, including in Indonesia where it was last employed in 2012;
- The construction of the index is transparent, as the DHS Program publishes all formulas, weightings, and breakpoints used to construct the index in each country;
- The DHS questionnaire—including the formal of the survey questions—is well-established in Indonesia and was previously deployed in Bahasa Indonesia by the Department of Statistics (BPS), so minimal survey design and testing was necessary; and
- The survey tool focuses largely on readily identifiable household assets (similar to those of the TNP2K program) and takes only 15 to 20 minutes to complete per household.
- Results of the DHS questionnaire are comparable to those of TNP2K.

How does the DHS Wealth Index work?

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Conducting B40 survey using mWater application.

The DHS wealth index is a composite measure of a household's cumulative living standard. The index is constructed using easy-to-collect information on a household's ownership of selected assets (such as a television, refrigerator, or handphone); the types of materials used for housing construction (such as whether the walls are brick or wood); and the types of water access and sanitation facilities used by the respective household. The data used in the construction of the current Indonesia Wealth Index comes from the 2012 country-level survey conducted in partnership with BPS. The survey collected data from nearly 44,000 households across the country, including 21.500 urban households and 22,300 rural households.

The Wealth Index is generated using a widely accepted statistical procedure known as principal components analysis (PCA). Also referred to as "factor analysis", PCA describes the statistical relationships of the observed variables, ultimately assigning a "weight" or "factor score" to each individual variable (household asset). The resulting asset scores are standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. The standardized scores of all 44,000

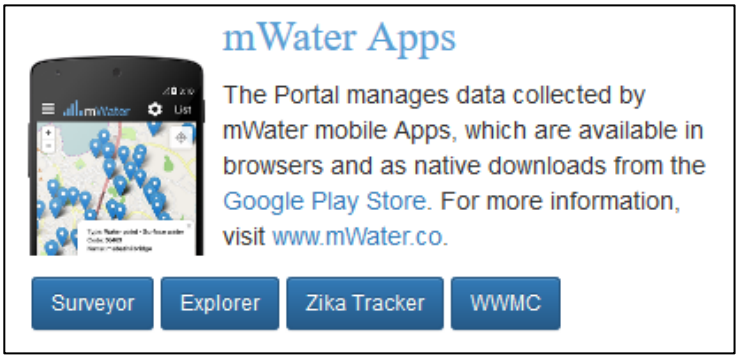
households are then ranked from smallest to greatest, which then allows for the creation of "break points" that define the five wealth quintiles as: Lowest, Second, Middle, Fourth, and Highest. [1]

The Indonesia DHS Wealth Index score for a given household is based upon the sum of 81 different asset variables. In other words, for each variable, the household receives a standardized score if it *has* or *does not have* a given asset (such as a refrigerator). Importantly, the relative size and directionality (positive or negative) of each asset's weighting indicates the extent to which it ultimately impacts the household's overall wealth score. The table at right, for example, lists the top 15 positively associated assets and the bottom 15 negatively associated assets for urban households. As you can see, a household with assets such as a ceramic floor, refrigerator, brick walls, and a private flush toilet (to septic) is likely to receive a high overall wealth score. Conversely, a household with wooden plank walls, a basic wood or brick floor that uses wood for its cooking fuel and only has access to a public toilet is likely to receive a very low wealth score (placing it in the bottom 40%).

Asset Type	Weighting/ Coefficient
Floor: Ceramic, granite, or marble	0.10702
Refrigerator	0.10696
Walls: Baked brick	0.10479
Sanitation: Private flush toilet to septic/sewer	0.10325
Cooking Fuel: LPG or natural gas	0.09520
Bank account	0.09036
Number of bedrooms	0.08726
Floor area of this house	0.08583
Motor cycle	0.08422
Television	0.08009
Car or truck	0.07725
Telephone	0.07297
Hand phone	0.06050
Radio	0.05542
Bicycle	0.05194
Drinking Water: Public tap	-0.02881
Sanitation: No facility	-0.03265
Drinking Water: Protected public well	-0.03289
Cooking Fuel: Kerosene	-0.03339
Floor: Dirt or sand	-0.03370
Walls: Woven bamboo	-0.04220
Roof: Metal/zinc	-0.04356
Roof: Thatch/palm/sod roof	-0.04446
Drinking Water: River, stream, creek	-0.04633
Number of members per sleeping room	-0.05981
Floor: Cement/brick	-0.06468
Sanitation: Shared/public toilet	-0.06623
Floor: Rudimentary wood, palm, bamboo	-0.06709
Cooking Fuel: Wood	-0.07854
Walls: Wood planks/shingles	-0.08034

How does USAID IUWASH PLUS collect household data for the Wealth Index? USAID IUWASH PLUS uses a mobile survey application (mWater) to conduct household surveys in beneficiary communities. The application allows project staff to easily enter data, capture photos and geo-coordinates, and directly upload data for review and cleaning with no risk of transcription error. The application has also been customized to immediately calculate the wealth score for each household. USAID IUWASH PLUS uses both sampling and census approaches to survey implementation depending on the geographic distribution of beneficiaries.

[1] See: http://dhsprogram.com/topics/wealth-index/

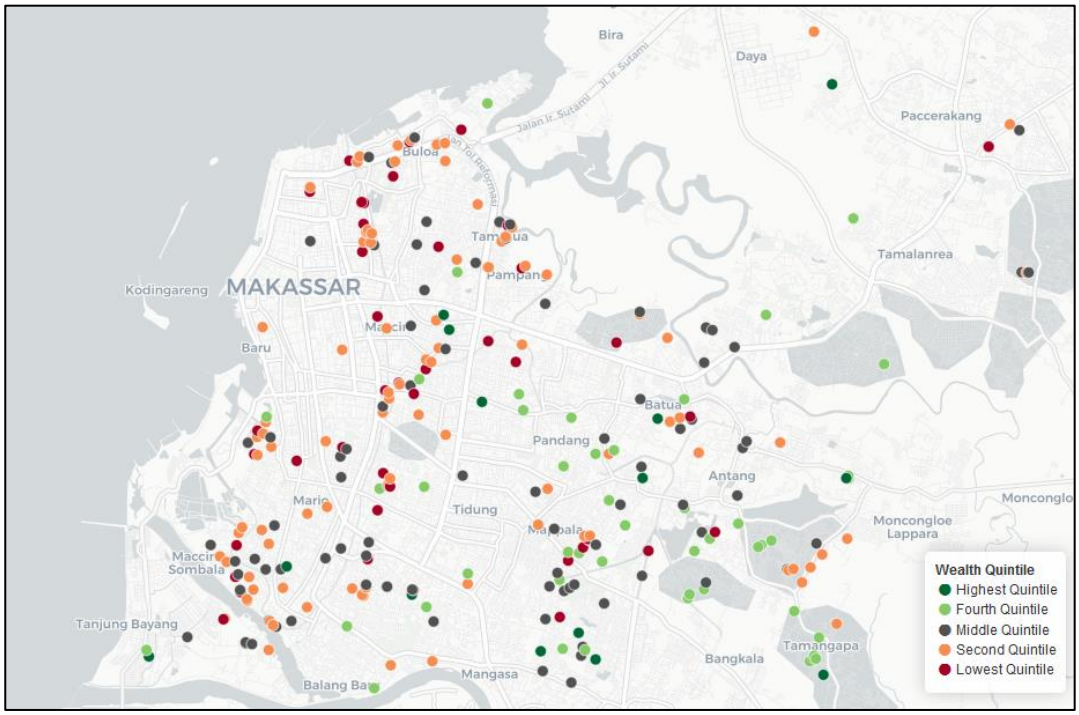


Once again, there is no perfect methodology for wealth classification, especially when reliable income and consumption data is not available. Further, socioeconomic status is not static: people move in and out of "poverty" on a monthly and even daily basis. The USAID IUWASH PLUS project therefore views the calculation DHS Wealth Index scores not as end in and of itself, but simply as a means to help measure whether it is achieving the desired outcome of expanding water and sanitation to the urban poor.

What have been the results to date?

USAID IUWASH PLUS conducted it's first round of data collection in preparation for its PY2 Annual Report in mid-2018. Over the span of six months, the IUWASH PLUS team conducted 12,438 household surveys across six provinces (North Sumatra, Banten, West Java, Central Java, East Java, and South Sulawesi), using the results of each 10- to 15-minute survey to assign households a wealth quintile. In accordance with the USAID IUWASH PLUS AMEP, the project collected socioeconomic data pertinent to two indicators: number of people receiving improved water services quality, and number of people gaining access to basic or shared sanitation services. Approximately 10,000 surveys were completed in conjunction to water services quality while more than 2,300 were carried out for people gaining access to basic/shared sanitation facilities. Importantly, IUWASH PLUS conducted a simple random sample of household beneficiaries within a given municipality, meaning that the results are representative at the municipality level with a 95% confidence level and 5% confidence interval.

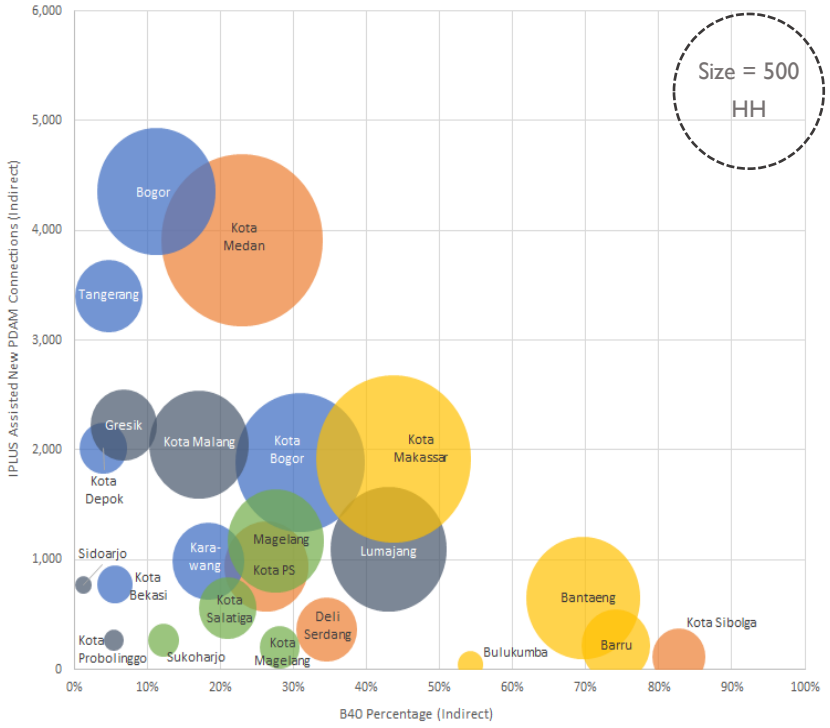
Exhibit 1Surveyed Households in Makassar by Wealth Quintile



Once the sample was selected, USAID IUWASH PLUS used a mobile survey application (mWater) to carry out the surveys, allowing project staff to easily enter data, capture photos and geo-coordinates, and directly upload data for review and cleaning with no risk of transcription error. The application was also customized to immediately calculate the wealth score for each household. The USAID IUWASH PLUS M&E team was then able to directly review the data in the mWater web portal in real time as it was collected. The online portal also facilitated the final analysis and visualization of the data in the form of charts and maps. Exhibit 1 below, for example, depicts the locations of the households surveyed for people receiving improved water services quality in Kota Makassar. Representing new water utility customers in 2017, those households symbolized with red or orange markers are classified in the bottom two wealth quintiles. Although the sample is limited to new water utility connections and is not meant to represent the urban population of Makassar writ large, there does appear to be a higher concentration of B40 households closer to the coast. Broadly speaking, it is common for poorer neighborhoods in coastal cities to be located near the water's edge where there is greater risk of flooding.

The complete results of the household surveys are presented in Annex 20 of the USAID IUWASH PLUS PY2 Annual Report, including the percentages of B40 households per indicator per municipality. Overall, an average of 32% of households under HR1 (access to safe water supply) were classified into the bottom two wealth quintiles yielding a total of 11,402 households. Not surprisingly, the percentage of B40 households ranged dramatically by municipality, from 1% in Sidoarjo district to 83% in Sibolga city. Under Outcome C1a (access to basic sanitation), approximately two thirds (66%) were categorized as B40 households, resulting in a total achievement of 3,505 households. The significantly higher poverty rate under C1a is to be expected given that the households lacking access to a basic sanitation facility are, by default, considered as lower income homes under the DHS wealth index.

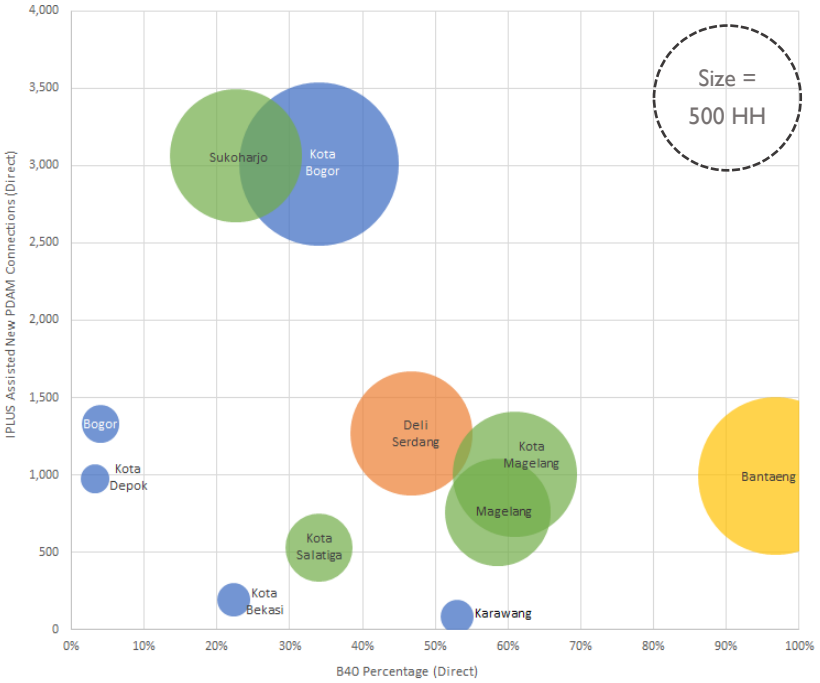
Exhibit 2: Bottom 40% Households by Municipality for Indicator HR1 (Indirect)



The graphics on the following page help to visualize the results for Indicator HR1, depicting the total number of indirect and direct B40 households per municipality. More specifically, the vertical axis quantifies the total number of new water supply connections in each city/district while the horizontal axis quantifies the percentage of B40 households resulting from the survey. Combined, these factors yield the total number of households per municipality (as symbolized by the size of the bubble). For indirect beneficiaries, Kota Medan had the greatest number of B40 households (900) given its large number of

IUWASH PLUS-assisted new connections in 2017 (nearly 4,000) in combination with a modest 23% of households surveyed found to be in the bottom two quintiles. Despite having less than half of the amount of new connections in 2017, however, Kota Makassar was a close second (with 840 households in the B40) as a result of its dramatically higher percentage of B40 households (44%).

Exhibit 3: Bottom 40% Households by Municipality for Indicator HR1 (Direct)



Concerning direct beneficiaries—or those where IUWASH PLUS played a more defined role—the greatest contribution of B40 households came from Kota Bogor. More specifically, the project facilitated water *hibah* connections for approximately 3,000 households in Kota Bogor, or more than 1,000 B40 households (based upon the B40 percentage rate of 34%).

Kabupaten Bantaeng also represented a major contributor during 2017; while the overall number of new water *hibah* connections was only 1,000, the percentage of poor households was an unmatched rate of 97%.

Looking ahead, USAID IUWASH PLUS will continue collecting wealth data on its beneficiaries on a rolling basis for new community-based systems. Further, the next round of data collection for PDAM customers will be in August 2019. USAID IUWASH PLUS also anticipates compiling a complete life-of-project analysis on the process for collecting socioeconomic data and its utility towards the end of the program. It is hoped that this experience can be used by other WASH programs seeking to verify the extent to which they are reaching the poorest and most vulnerable households.

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