International Journal of Technology (2018) 7: 1308-1318
ISSN 2086-9614

IDENTIFICATION OF THE CHARACTERISTICS AND PATTERNS OF CLEAN WATER CONSUMPTION AT THE HOUSEHOLD LEVEL

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(Received: June 2018 / Revised: August 2018 / Accepted: December 2018)

ABSTRACT

The Varied water use in every aspect of life makes its availability extremely important; this beneficiary is strongly influenced by its quantity and quality. Community participation is needed to identify the characteristics and patterns of clean water consumption, especially at the household level, in order to better understand and explore the quantity of clean water consumption and the related behavior of the community of this project. Thereafter, efforts should be made to encourage the conservation of clean water consumption from the aspect of needs control. It can be seen from the results of the project that there is water saving potential from six main activities of household water usage, namely bathing, brushing of teeth, washing of hands and face, dish washing, clothes washing, and floor cleaning. To obtain the best data quality, the data collection method of each activity is divided into secondary and primary data, collected either through other sources or references, or by conducting a direct survey in the field of the target respondents selected. The study measures how much clean water saving potential there was with regard to nine respondents selected through a joint selection process. The greatest water saving potential derived from behavioral changes in washing activities, at 90 liters per activity. The potential water savings that could be achieved in the dish washing activity amounted to 86.4 liters. By undertaking the water saving activities in line with the calculations of the research, the respondents could save between Rp 136.797 (US$ 9,4) to Rp 192.103,- (US$ 13,2) per month.

Keywords: Community participation; Household scale project; Water crisis; Water saving

1. INTRODUCTION

The World Health Organization (WHO) defines household water as "water used for all domestic purposes including the preparation of consumption, bathing, and food" (World Health Organization, 1993). Based on the data, it is estimated that more than 2 billion people per day are affected by water shortages in more than 40 countries worldwide. 1.1 billion do not have adequate water and 2.4 billions do not have access to proper sanitation. By 2050 it is predicted that 1 in 4 person will be affected by a shortage of clean water (McGilloway, 2005). In Indonesia, with a population of more than 200 million, the need for clean water is becoming more urgent.

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Permalink/DOI: https://doi.org/10.14716/ijtech.v9i7.2509

As water is the most important and necessary resource for all living things, many problems can be triggered if there are situations in which its availability is not sufficient to meet these needs, whether for domestic, industrial or urban purposes. Scarcity of water will cause not only health problems, but also social, economic, political and humanitarian ones. The threat of water crises has become a global one, including in Indonesia. A number of areas in big cities in the country are facing a shortage of clean water supply. As the availability of clean water sources has been declining over time, due to both hydrological cycle disturbance and water body pollution, engineering efforts are needed to ensure its availability, followed by efforts to control the use of water by the community.

According to the research of Shan et al. (2015), The project Integrated Support System for Efficient Water Usage and Resources Management (ISS-EWATUS) in 2014 at the household level in the European Union (EU) such control was achieved by the development of a decision support system to provide householders with good awareness of their daily water consumption in a meaningful and effective way, and in turn to promote a reduction in water consumption. Therefore, community participation is needed to identify the characteristics and patterns of clean water consumption, especially at a household level, in order to better understand and explore the quantity of clean water consumption and the realted behavior of the community. An improved understanding of daily water consumption practices will encourage consumers to adopt water conservation behavior (Fan et al., 2014). Subsequently, efforts can be made to encourage the conservation of clean water consumption from the needs control aspect. The expected outcome of this research is knowledge of the behavior of residents in using or consuming clean water, as well as establishing what can be done with regard to the conservation (water-saving) of clean water in terms of demand management, so that education and intervention can be developed in the community to help people adopt more efficient and sustainable water use behavior (Hamilton, 1983).

2. METHODS

2.1. The Pattern of Clean Water Consumption per Activity

To obtain the best data quality, the data collection method of each activity was divided into two, namely secondary and primary data, collected either through other sources or references, or by conducting a direct survey in the field of the target respondents selected (Linsey et al., 1985). The necessary primary data and information were obtained in two ways: by conducting direct interviews using questionnaire tools; and by conducting observations and measurements in the field involving the community or selected respondents with regard to the large volume of water usage in six types of household activities. These were used as the focus of observation. Prior to initial data collection, a workshop was held to educate the respondents about the importance of understanding the current and future water crisis conditions, and the strategic role of the community in reducing the use of clean water in their homes.

In this study, the sample was chosen using the non-probability sampling technique, because such a technique gives an equal opportunity for every member of the population to be selected for the sample. The type of technique used was quota sampling, which was conducted by sampling members of the population with certain characteristics matching the desired amount or quota. The sample was taken from various respondents who had followed the workshop and focus group discussion (FGD); they were selected based on the diversity of their level of awareness of potential water saving. The study measured how much potential for saving clean water was made by nine respondents selected through a joint selection process by Marketing Research Agency Jakarta, with the criteria including households living in the DKI Jakarta area, which are considered able to provide an overview of the condition of the population, with a variety of water saving awareness levels. The respondents were also classified by the household

classification categorized from the local water company (*Perusahaan Daerah Air Minum, or PDAM*). Customer category classification was based on the building or house area, in accordance with Governor Regulations (Gubernur Provinsi Daerah Khusus Ibukota Jakarta, 2017).

Table 1 Water saving campaign respondent data

No.	Respondent	Address	Occupation	Age	Water Source	PDAM Customer Description
1	Tatik	Kemanggisan, West Jakarta	Housewife	38	Groundwater	Simple Class Household
2	Pungky	Kebayoran Lama, South Jakarta	Housewife	38	PDAM	Group III B Middle Class Household
3	Iwan	Batu Ampar, East Jakarta	Bank Employee	39	PDAM & Groundwater	Group III A Simple Class Household
4	Mulyana	Cililitan, East Jakarta	Housewife	37	Groundwater	Simple Class Household
5	Deny	Cililitan, East Jakarta	Employee	37	Groundwater	Middle Class Household
6	Riza	Cikini, Central Jakarta	Employee	30	PDAM & Groundwater	Group III B Middle Class Household
7	M. Jamal	Matraman Pengangsaan, Central Jakarta	Employee	37	Groundwater	Simple Class Household
8	Sintisye	Matraman Dalam Pengangsaan, Central Jakarta	Employee	27	PDAM	Group III A Simple Class Household
9	Arinda	Kebayoran Lama, South Jakarta	Bank Employee	27	PDAM	Group III B Middle Class Household

Household consumption appliances consist of tubs, water dippers or scoops, buckets and water taps, amongst others, and are identified to ascertain the level of use of the equipment, which can be measured by volume. In addition, to measure the amount of consumer water use by equipment such as showers and faucets, the flow rate of each plumbing unit was measured. The flow rate of different equipment can affect the level of household water consumption, which will also be different. Therefore, the flow rate is an important indicator for understanding the amount of domestic water use. Inferential analysis was used to test the difference in the average amount of clean water consumption for washing clothes with daily clothes washing frequency, examining the average difference in net water consumption of respondents using public and private water sources. Pearson's association analysis was used to determine the relationship between the number of rinsing clothes and the amount of clean water consumption for the purpose of washing clothes. The test procedure was based on the Green Venture website: *How to Conduct a Flow Rate Test*, 2007. Testing instruments consisted of a stopwatch, a certain number of containers or vessels, and a calculator.

2.2. The Amount of Water Used in Each Household Activity Variable

This section presents the calculation of the amount of water used in each type of household activity as variables in the study.

2.2.1. Showering

The determination of the volume of water used in this activity depends on the type of tool or

water container used (Kindler and Russell, 1984). In this case, the number of buckets is changed into tub or bucket form, then the volume used depends on the shape of the container used.

For the bucket, the formula used is

$$A = d \times e \times \pi \times i^2 \times h \times 1000 \quad (1)$$

Whereas if the container is a tub, the formula used is

$$A = d \times e \times f \times g \times h \times 1000 \quad (2)$$

where A is showering (liters); *d* is number of tools; *e* is frequency of implementation (within 1 week); *f* is length (meters); *g* is width (meters); *h* is water level (meters); and *i* is r / radius of a circle (meters).

2.2.2. Laundry

The use of water in laundry washing can be calculated using the formula

$$B = j \times f \times \pi \times r^2 \times t \times 1000 \quad (3)$$

where B is use of water for washing clothes (liters/person/week); *j* is number of tools; *f* is frequency of implementation (within 1 week); *t* is length of tools (meters); and *r* is the radius of a circular tool (meters).

2.2.3. Dishwashing and cleaning the floor

In calculating water usage for dishwashing activities, the faucet unit is converted into the container used. This is done so that the number of tools used is easier to observe; in order to obtain the amount of water used the following equation can be used

$$C \text{ or } D = j \times f \times \pi \times r^2 \times t \times 1000 \quad (4)$$

where C is use of water for dishwashing (liters/person/week) and D is use of water for cleaning the floor (liters/person/week).

2.2.4. Brushing of teeth and hand washing

To obtain the amount of water used in the teeth brushing and hand washing activities, the equation or formula used is

$$E \text{ or } F = j \times f \times \pi \times r^2 \times t \times 1000 \quad (5)$$

where E is use of water for brushing teeth (liters/person/week) and F is use of water for hand or face washing (liters/person/week).

2.3. Determination of Water Saving Potential

The magnitude calculation of the potential for water saving is made by taking the average value of observations and measurements made over the course of approximately 3 weeks with regard to six focused activities and by measuring the highest saving value that can be achieved by the participants in this pilot project activity. The highest value achieved will be the number of possibility value that can be achieved if the austerity effort is performed well and correctly.

3. RESULTS AND DISCUSSION

After obtaining the volume of household water used with each activity, i.e. brushing of teeth, bathing and shampooing, face and hand washing, clothes washing, dishwashing and floor cleaning, a table of observations or research questionnaires were also provided and used by the participants to record their water use in each activity. Measurements were made directly to measure the amount of discharge or volume in the measuring object used in each house. Therefore, it was possible to obtain the level of household water usage from the pilot project

water saving campaign which involved the participation of the community that had the highest potential as follows.

Table 2 Water saving campaign preliminary data benchmark

Types of activity	✓	Low - Middle Class of Economy (l/cap/day)	Middle - High Class of Economy (l/cap/day)	Tools / Equipments
Tooth brushing		3.00	3.50	Measuring Glass and stopwatch
1. Turn off water when brushing teeth	✓			
2. Using only 1 dipper while brushing teeth	✓			
3. dry method of tooth brushing	✗			
Showering and Hair Washing		51.94	48.10	Measuring Glass , stopwatch, and water container
1. Do many activities in 1 times bath e.g. wash the body and wash the hair	✓			
2. Turn off the faucet when taking a bath or shower or if the water basin is already full	✓			
3. Turn off the faucet or shower when applying shampoo to the hair	✗			
Face and Hand Washing		5.00	4.00	Measuring Glass and stopwatch
1. Turn off the faucet when rinsing the face or hands	✓			
2. Use hand sanitizer for washing hands instead of water	✓			
Laundry		27.09	40.20	Measuring Glass , stopwatch, and water container
1. Doing only one rinse when washing clothes	✓			
2. Re-use the rinsing/soaking water for another cleaning purpose	✓			
Dish washing		12.40	23.40	Water Container
1. Use 2 buckets for dish washing (1 for cleaning and 1 for rinsing)	✓			
2. Turn off the water when applying soap to the dishes	✓			
Floor Cleaning				Water Container
1. Only using 1 bucket for Floor Cleaning	✓			

Source: Indonesia Water Institute, 2013

According to Tables 1 and 2, from the calculations made in the water saving campaign, it can be seen that the largest delta (Δ) water saving, the final volume is reduced by the initial volume of each activity, of household water are obtained from the activities of clothes washing and dishwashing. Clothes washing plays an important role in the use of clean water in households because the volume of water used is relatively large. Respondents tend to use 4-7 large buckets with an average size of 20-45 liters for washing clothes. After the socialization and explanation of the use of water for households and water saving activities, which was also supported by giving the respondent some environmentally friendly products, the respondents only needed to use 1-3 buckets to wash their clothes ; it can be seen from the delta (Δ) potential water saving obtained from this pilot project that using once rince product for washing clothes can save as much as 90 liters.

Table 3 Highest potential water saving campaign survey final data

Type of activity	Initial Volume (L)	Final Volume (L)	Information	Δ water saving pilot project (L)	Average Score for All Respondent
Tooth brushing					
Using only 1 dipper while brushing teeth	3.27	1.09	1 water dipper = 1090 mL	2.18	1.52
Showering and Hair Washing					
Do many activities in a one-off bath e.g. wash the body and wash the hair	33.25	13.3	1 water dipper = 1330 mL	19.95	8.45
Face and Hand Washing					
Use hand sanitizer for washing hands instead of water	6.25	2.50	1 water dipper = 1250 mL	3.75	3.70
Laundry					
Doing only one rinse when washing clothes	225	135	1 bucket = 45 L	90	47.78
Re-use the rinsing/soaking water for another cleaning purpose	Re-use the Laundry rinsing for Floor Cleaning				
Dishwashing					
Use 2 buckets for dish washing (1 for cleaning and 1 for rinsing)	23.42	11.71	1 bucket = 11.71 L	11.71	65.80
Turn off the water when applying soap to the dishes	148.8 (31 min)	32.4 (13 min)	in minutes	86.40	
Floor Cleaning					
Only using 1 bucket for Floor Cleaning	17.44 L		Re-used water = 1 bucket from laundry rinse		17.44

Furthermore, in the activity of washing dishes or cooking and eating utensils, the old habits of Indonesian people, especially in Jakarta, who sometimes forget to turn off the faucet when washing dishes/glass/cookware are seen in this project. In this pilot project, the largest delta (Δ) savings were 86.4 liters from washing activity. This is because of the behavior of people who initially did not turn off the water when washing their dirty dishes; the water-saving behavior of turning off the faucets only obtained a delta of 86.4 liters. Based on the literature and surveys related to this study, the average community that bathes using a scoop or water dipper of about 15–20 liters/person (De Buck et al., 2015), for did many activities in a one-off bath, silmutaneously rinsing the body foam and shampoo. In the pilot project, on average when showering respondents used 15–30 scoops/person for each shower, with the size of a scoop varying in each home. They showered for 5 minutes with a volume of 30 liters/person each time. The average community in Indonesia has the habit of not turning off the water when showering, which causes waste (which will also lead to wasted soap). A faucet left on for 1 minute will discharge approximately 260 mL of water every 3 seconds. The respondents were selected based on varying levels of concern about the potential for water saving and the respondents followed the Focus Group Discussion organized by Marketing Research Agency Jakarta.

This pilot project activity was conducted for approximately three weeks (18 November – 6 December 2013). The first visit was made to each respondent's house to give a detailed

explanation of what would be done during the activity, what kind of participation was expected, and what benefits would be obtained either directly or indirectly by them.On the second visit, there was a discussion and measurement of the patterns and the amount of water consumption made during one week in the savings effort, based on the directions which was given by the team on the first visit. On this visit, a discussion related to the obstacles faced both technically and non-technically during the savings effort was also held. The third visit was practically the same as the second one, and discussions related to the success of the participants in their efforts to save water on a household scale were also held. Almost all the respondents used groundwater as a raw water source for household activities. This source of water is important for household activities, as it is not constrained by technical problems from the local water company (*Perusahaan Daerah Air Minum or PDAM*); respondents felt it was difficult to obtain water if they only relied on PDAM. It was noted that the population of some areas in Jakarta generally prefers to use groundwater, based on its better taste and color, and also because it is less expensive than the water supplied by PDAM (Hartono et al., 2010). Almost all the respondents were initially unconcerned about the current water conditions. This classified them as a society wasteful in water usage; the study is expected to gradually change their way of thinking about the responsible use of water.

Table 4 Water saving campaign activity based on the questionnaire

No.	Activity	Water Saving Activity Based on the Questionnaire
1	Brushing Teeth	Use only one dipper while brushing teeth
2	Bathing	Do many activities in a one-off bath, e.g. wash the body and hair
3	Hand Washing	Use hand sanitizer for washing hands instead of water
4	Laundry	Doing only one rinse when washing clothes
5	Dish Washing	Use buckets for dishwashing; one for cleaning, one for rinsing Turn off the water while applying soap to the dishes
6	Floor Cleaning	Re-use the laundry rinsing for floor cleaning

Table 5 Water saving campaign with average score for all respondents based on the questionnaire

No.	Respondent	Delta Water Saving (L)					
		Brushing Teeth	Bathing	Hand Washing	Laundry	Dish Washing	Floor Cleaning
1	Tatik S.	2.17		0	46.5	65.1	-
2	Pungky H.	1.38		0	45	11.71	-
3	Iwan K.	1.33	19.95	1.99	24	37.8	-
4	Mulyana	1.39	6.95	1.39	0	0	-
5	Deny	0	7.2	2.4	90	86.4	-
6	Riza	0	5.48	1.09	90	20	-
7	M. Jamal	2.18	8.72	3.27	52.32	0	17.44 (from leftover rinses)
8	Sintisye T.	1.25	13.75	3.75	45	312	-
9	Arinda R.	4	14	12	34,5	59.2	-
	Average	1.52	8.45	3.70	47.48	65.80	-

The participants in this pilot program were a household group in Jakarta Capital City which came from East Jakarta, West Jakarta, Central Jakarta, and South Jakarta, with varied educational and work backgrounds. Almost all of them were fully engaged in the utilization or consumption of clean water in their households. The results of direct measurements and interviews at the survey location were in the form of a series of data related to the amount of water use figures in each household activity which was the variable in this project. Through the

results of the interview method approach, the household activities which use water in significant amounts can be analyzed.

As mentioned earlier, the water crisis has caused the impetus to undertake water saving projects, so the water that has been saved can be enjoyed by people who do not have access to adequate sources of clean water (Ali, 2011). Because water saving is an action that can be taken to maintain the sustainability of the clean water supply, the smallest actions taken to save water must have positive impacts on the water crisis that we are experiencing. Based on the data from Table 3, it can be seen delta (Δ) water saving (the final volume is reduced by the initial volume of each activity) or the difference in the volume of water use of each activity from the tips provided by the team to the respondent. Any suggestions for reducing water use can be applied by the respondents. However, there are some tips or suggestions that are not usually done by the respondents, so 4 weeks' of potential savings are still not seen to be as significant as they should be. So from the series of pilot project activities during the 4 week period, the suggestions from the team to the respondents for household activities with the aim of reducing the volume of water used, such as turning off the tap water if it is not being used during household activities such as showering, brushing teeth, dishwashing or handwashing; using one scoop or even one cup to brush the teeth; conducting several activities at one time, like showering, shampooing, and washing the face; doing only one rinse to wash clothes; and use the remaining rinsing or soaking water from washing clothes for other household uses, such as washing vehicles (cars and motorcycles) or mopping or cleaning floors, or for watering the plants.

The tips mentioned above can be used as guidance in conducting water conservation activities in everyday life. By saving water, not only can the environmental benefits be perceived, but the cost of water usage can also be saved, and such costs incurred in consuming water can be diverted to other needs. However, not all of the above tips can be applied directly to the respondents. To brush teeth with the dry method is not considered applicable in the community because of the habit of people who tend to like a lot of foam when brushing their teeth. Changes in water saving behavior usually require a continuous and consistent campaign process, because it will always be faced with many obstacles, such as cultural aspects, self-awareness, understanding the benefits of saving water of directly or inderectly, and the availability of supporting facilities and infrastructure (Ali, 2011). From an economic point of view, there are considerable savings if respondents use PDAM. Respondents with the greatest potential savings were mostly classified as Category III A for low level households and Category III B for middle level households. On Table 7 the basic water tarif was according to the Regulation of the Governor of DKI Jakarta Province Number 91 the year of 2017 concerning the Second Amendment to Governor Regulation Number 11 the year of 2007 concerning Automatic Tariff Adjustment (PTO) for Semester 1, the year of 2007.

Based on Tables 6 and 7, it can be seen that by conducting pilot project activities according to the calculations, the respondents could save from Rp 136,797 (US$ 9.4) to Rp 192,103.35 (US$ 13.2) per month. These figures are quite large for the results of monthly water saving and can be allocated by families for more important needs. This proves that the awareness of conserving water, together with some tips that can be followed by everyone, can provide benefits for all aspects, both in terms of water saving and also in terms of economic value.

The quantified potential water savings that can be made by most of Indonesia's population, based on temporary data from the results of this pilot project activity, are very large and can be significant, especially in the face of the threat of the water crisis. As a rough idea, there follows a quantitative picture of the potential savings that can be achieved by the total number of Indonesians, which is currently 252 million people, with a total estimated number of

households of about 50 million. We assume that if about 30% of the total number of households participate in the water saving program through the three main routine activities mentioned above, the potential for national water saving is as follows. From laundry or clothes washing activity it is 30% × 50,000,000 household × 90 L/day = 1.35 billion liters = 1.35 million m^3 every day.

Table 6 Recapitulation data of water saving campaign

Type of activity	Highest Potency				Average			
	L/person/day	L/day	L	m^3	L/person/day	L/day	L	m^3
Use only one dipper when brushing teeth	2.18	10.90	327	0.33	1.52	7.60	228	0.23
Do many activities in a one-off bath e.g. wash the body and wash the hair	19.95	99.75	2992.50	2.99	8.45	42.25	1267.50	1.27
Use hand sanitizer for washing hands instead of water	3.75	18.75	562.50	0.56	3.70	18.50	555	0.56
Doing only one rinse when washing clothes	90	450	13500	13.50	47.78	238.90	7167	7.17
Use buckets for dish washing; one for cleaning, one for rinsing	11.71	58.55	1756.50	1.76	65.80	329	9870	9.87
Turn off the water when applying soap to the dishes	86.40	432	12960	12.96	65.80	329	9870	9.87
Re-use the laundry rinsing for Floor Cleaning	17.44	87.20	2616	2.62	17.44	87.20	2616	2.62

Table 7 Calculation of the economies from the water saving campaign

Type of activity	Basic Water Tariff		Notes	Savings	
	0-10 m^3	11-20 m^3		Highest Potency	Average
Brushing Teeth	Rp 3,550.00	Rp 4,700.00	Group III A	Rp 1,160.85	Rp 809.40
Bathing	Rp 4,900.00	Rp 6,000.00	Group III B	Rp 14,663.25	Rp 6,210.75
Hand Washing	Rp 3,550.00	Rp 4,700.00	Group III A	Rp 1,996.88	Rp 1,970.25
Laundry	Rp 4,900.00	Rp 6,000.00	Group III B	Rp 81,000.00	Rp 35,118.30
Dish Washing	Rp 3,550.00	Rp 4,700.00	Group III A	Rp 6,235.58	Rp 35,038.50
Applying soap to the dishes	Rp 4,900.00	Rp 6,000.00	Group III B	Rp 77,760.00	Rp 48,363.00
Floor Cleaning	Rp 3.550,00	Rp 4.700,00	Group III A	Rp 9.286,80	Rp 9.286,80
Total (Rp/month)				Rp 192,103.35	Rp 136,797.00

This amount is equivalent to meeting the clean water needs of 15 million people or 3 million households with a daily consumption of 90 liters/capita/day. From cooking and/or dishwashing activity it is 30% × 50,000,000 households × 86.4 l/day = 1.30 billion liters = 1.30 million m^3 every day. This amount is equivalent to meeting the clean water needs for 14.44 million people, or 2.89 million households with a daily consumption of 90 liters/capita/day.

From bathing and shampooing activity the figure is 30% × 50,000,000 household × 19.95 l/activity = 299.25 million liters = 299,250 m^3 every bath, or about 598,500 m^3/day. For example, with an average of two baths per day, the amount of water saved from this activity would be equivalent to meeting the clean water needs of 6.65 million people, or 1.33 million households with a daily consumption of 90 liters/capita/day. If there is a potential water saving from the three activities above equal to the amount of water that can be given to other Indonesian people who still have big barriers to accessing clean water, about 36.09 million

people (14.32% of the total population of Indonesia in 2013), or about 7.22 million households, will be able to enjoy the clean water saved.

Furthermore, if every household succeeds in saving water through these three main activities, every day there will be savings of 216.3 liters/household/day, or 6.49 m^3/household/month. If the average water price for Group III Customer B (medium households) of *Perusahaan Air Minum* (PAM) Jaya DKI Jakarta, pursuant to Pergub DKI Jakarta Number 11 of 2007, is Rp 6,000 per m^3, then every household will be able to save Rp. 38,940 every month.

The household sample in this Pilot Project activity was acquired from the middle to lower economic class in Jakarta city, which mostly uses groundwater sources or artesian wells. This is because the cost of connection fees is too high and is often a burden for the majority of households in the respondents' residential area, even though it has been included in the PAM service area. In addition, according to *Output-Based Aid in Indonesia* (Menzies and Setiono, 2010), why areas with a majority of low-income citizens in Jakarta are not included in clean water services is because of reasons such as concession holders lacking investment to expand their network to these areas, where lower class citizens live in illegal places. The concession holder is not authorized by DKI Jakarta to expand the network to these areas, and many lower-class people do not have the necessary administrative qualifications to be eligible for new connections. Furthermore, a successful communication program is needed to build trust between the community and stakeholders, which can influence the level of community support for water saving (Priadi et al., 2017).

4. CONCLUSION

Based on the research or pilot project activities for the water saving campaign that has been conducted in a limited way, the conclusions obtained are as follows. There is delta water saving potential from six main activities of water usage on a household scale, namely bathing, brushing of teeth, hand and face washing, dishwashing, clothes washing, and floor cleaning. The greatest water saving potential derived from behavioral changes in washing activities is 90 liters per activity, and the potential water savings that can be achieved in washing dishes amounts to 86.4 liters per activity. Meanwhile, the potential savings of clean water in bathing activities and at the same time cleaning the hair/head with shampoo is 19.95 liters per activity. However, the potential for water saving for three other activities, teeth brushing, hand washing and floor cleaning, still require further education in the pilot project opportunity; because of time constraints these areas were underdeveloped.

5. ACKNOWLEDGEMENT

This research was supported/partially supported by Unilever Indonesia Foundation and Indonesia Water Institute. We thank our colleagues from the Indonesia Water Institute and Prompt-Research Jakarta, who provided insight and expertise that greatly assisted the research. We also thank our respondents and surveyors for their contributions and insights.

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