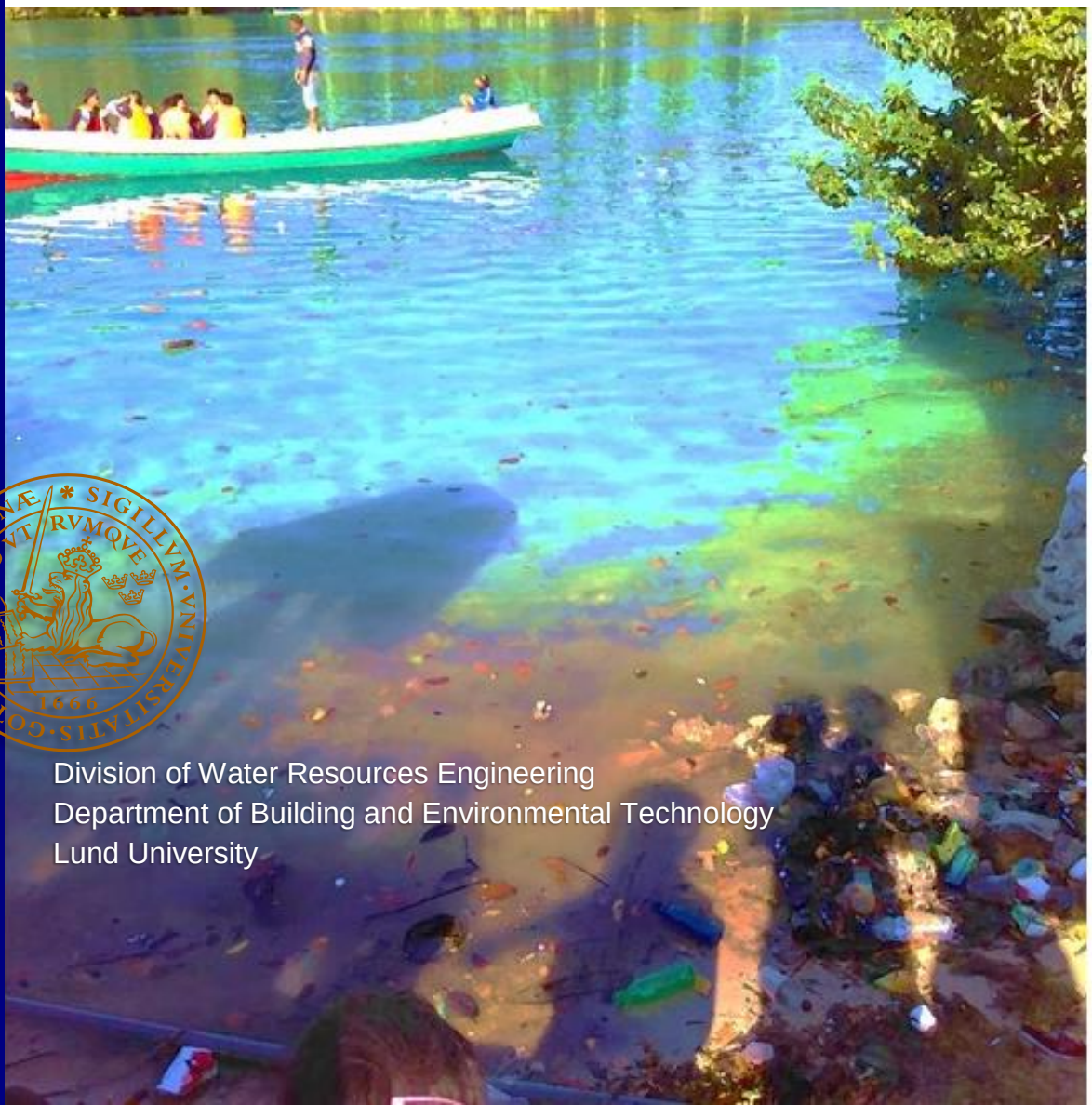
Master Thesis
TVVR 17/5004

Water Literacy in Developing Country

A case study for Indonesia

Arlisa Febriani



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Water Resources Engineering
TVVR-17/5004
ISSN 1101-9824

Lund 2017
www.tvrl.lth.se

Master Thesis
Division of Water Resources Engineering
Department of Building & Environmental Technology
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Swedish title:	Vatten literacy i utvecklingsland -En fallstudie för Indonesien
English title:	Water Literacy in Developing Country - A case study for Indonesia
Author(s):	Arlisa Febriani
Supervisor:	Linus Zhang
Examiner:	Magnus Persson
Language	English
Year:	2017
Keywords:	water literacy, developing country, water conservation

بسم الله الرحمن الرحيم

Acknowledgements

Alhamdulillahirrabbil'alamin, All praise and gratitude to the Rabb of the universe.

My sincere gratitude for Lund University, IKEA Indonesia and all the Blue Bag Award organizers, thank you for allowing me to receive a 'once in a lifetime' opportunity, studying in a world class university that taught me to understand, explain and improve the condition of human world.

I would like to thank my supervisor, Linus Zhang, thank you for all the guidance, encouragement and valuable comments throughout this thesis project. I would also like to thank to my examiner, Magnus Persson, and to my opponent, Cecilia Lundqvist, thank you very much for all the valuable input and comments for the report and during presentation.

To Papa Sahat Tobing, thank you for always believing in me; My dearest husband, Tegar Adiarsa, thank you for your unlimited patience; Ibu Trisnawati, haturnuhun pisan piduana. All beloved family: Yaman, Tobing, Wiharja. To my 'little sister', Afina; Lovely neighbor, Zanzer family, and all the amazing friends and Indonesian colleagues in Lund.

To Alkiva and Zikra, Ibu loves you so much, uhibukifillah.

Abstract

Public participation is vital to ensure sustainable water management, and providing education is one of the way to trigger participation. For decades, developed countries try to educate their citizen to be environmentally literate, and for the water sector, water-related knowledge has been introduced to the public by schools, municipalities and water utilities. The condition is harder for developing countries, especially in Indonesia, where government fund is insufficient to support both infrastructure and education development. Education on water- related knowledge is very limited and rarely executed by local government and water utilities, resulting in several water problems caused by people behaviour. Considering the limited information provision for the citizen, this study tried to assess water literacy of Indonesian citizen using on-line survey followed by an in-depth analysis. The survey was targeting at the middle-income individuals. The most important results are: 1) Mean score of water literacy among the women group is lower than men 2) Mean score of all respondents shows low level of water literacy 3) Products which has possibility to pollute the environment based on this study are cooking oil and personal care products which contain micro-plastic. The study results also confirm the need of better water education for household level and recommends several issues to be covered in the education material to prevent further water pollution problem caused by household.

Keywords: water literacy, developing country, water education, water conservation.

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1. Introduction

As a substance with interesting characteristic, water enables and supports the life of human being on earth (McIntosh and Pontius, 2016). During the last decades, there is a global effort to provide better access to clean water for larger area, resulting in prolonged life expectancy and improved overall human health (Koppaka, 2011).

Better condition of public health contributes to an increase in human population, which gives another challenge to water provision in the future. Human activities produce waste and consume water, two things that affect the quality and quantity of the water itself. The water quality threatened by the fact that waste from human activities often reaches and contaminate the water way, and on the other hand, water quantity is threatened by the growth of urbanisation and population which takes place in a water limited area. These situations more likely happened in the developing world (McIntosh and Pontius, 2016).

Water problems in the developing countries could be seen clearly by comparing number of people with and without access to improved water and sanitation infrastructure. Currently, there are 2.6 billion people around the world with improved access to clean water and 663 million people without access to clean water. For the sanitation sector, the number of people without access is greater than the one with access; 2.4 billion and 2.1 billion respectively (UNDP, 2016). People without access to clean water and sanitation mostly situated in the developing countries, since most of the wastewater infrastructure development in this area hindered by a lack of investment, and the situation is getting worse because the infrastructure development rate is slower than the population growth (Sato, 2013).

Because millions and billions of people still have improper access to water and sanitation services, most of the efforts and plans to address the issue are more about reducing the number by executing infrastructure development projects as stated in targets and indicators of Millennium Development Goals (MDGs indicator 6.1 and 6.2) and Sustainable Development Goals (SDGs indicator 6.11, 6.21 and 6.31). A study by Kerstens et al in 2015 analysed

existing sanitation framework planning in developing countries and proposed a more comprehensive method to be applied, all of which speaks about investment and policy to support infrastructure development.

Even though the importance of infrastructure development is obvious, there is one aspect of water management that remains overlooked in the context of developing country: education to support sustainable water consumption and pollution reduction or pollution prevention, especially for those who already gain access to water and sanitation services. This is important to consider because as the population grows, challenges to manage water will increase, especially if we include the climate change effects to the equation. Addressing such complex challenge will need collective efforts, and increasing public participation is one of the stepping stone that needs to be put in place (Rogers and Leal, 2010).

One way to increase the public participation in taking care of the environment (especially to conserve and practice a sustainable water consumption), is by education; because education is one path to increase knowledge, and knowledge has been recognised as a valuable factor to support sustainable water management initiatives (Dean et al, 2016).

In Indonesia, there are 68.8% of the population who have a high understanding of environmental knowledge, but there are only 44.7% of the population who have high participation in applying environmental knowledge (KLH-RI, 2013). These data show a gap between knowledge and application, it indicates that there is a need to increase the number of people who participate in taking care of the environment. People's ignorance about the environment, especially for water resource, reflected in the poor-quality status of the water resource; as for the surface water, domestic wastewater is the main pollution source in the country (ADB, 2016).

1.1. Objectives

This study will try to assess the water-related knowledge and perception of Indonesian citizen (water literacy), especially women, and analyse domestic activities that will contribute to water pollution, including the product types with potential contribution to water pollution.

This study will provide a recommendation to construct or improve education material on water conservation for households in Indonesia, therefore frequency analysis of domestic activities with water pollution potential was presented in the report. The informations retrieved from the survey will be used to determine priority topic of education material, which hopefully will minimise water pollution from household activities.

1.2. Methods

Methods to understand the water-related knowledge and perception of Indonesian citizen used in this study was by executing an on-line survey that is spread in social media channels. To support analysis and construct a better understanding regarding water conservation and water-related knowledge, the thesis works includes literature search and review which mainly using the online library service. To understand the survey result, statistical analysis performed using Microsoft Excel software and SPSS version 24. Details of methodology used in this study will be discussed in chapter 3.

1.3. Limitations

Assessment of water literacy using on-line survey automatically exclude people without internet connection, therefore, the result from this study will only describe water literacy of people with access to internet connection.
Duration and survey platform used in this study require a stable internet connection, which could only be accessed by middle-income individuals. Thus, this study will only cover water literacy of middle-income individuals which have access to the internet and actively use social media.

2. Literature Review

2.1. Overview of Indonesia

Indonesia is an archipelago country located in South East Asia. Neighbouring countries that shared land border with Indonesia are Malaysia, Brunei Darussalam, Timor-Leste and Papua New-guinea. Geographic coordinates for Indonesia are 5 00 S, 120 00 E (CIA, 2016). The total area of Indonesia is 1,910, 931 km2 which consist of 17,504 islands and made Indonesia as the largest archipelago country in the world (Statistic Indonesia, 2016; ADB, 2016). It is estimated that 258,705,000 people live in Indonesia, placed Indonesia in the 5th rank of country with highest population in the world (CIA, 2016)

Figure 2.1 Map of Indonesia (Mapchart.net, 2017)

There are five main islands in Indonesia and the capital city of Indonesia (Jakarta) is in one of the main island, Java island. Java Island is categorised as the most populated island in Indonesia. The proportion of population distribution (in percentage) among these islands shown in Table 2.1. Around 54% of the population in Indonesia live in the urban area (Data.worldbank.org, 2017). Comparing with the population distribution from Table 2.1, it is obvious that most of the urban area mainly located on the Java island.

Table 2.1 Main Islands and Population Distribution

Island	Land (Km^2)	Population (%)
Jawa	129,438.28	57.49
Kalimantan	544,150.07	5.8
Maluku & Papua	494,956.85	2.6
Sulawesi	188,522.36	7.31
Sumatera	480,793.28	21.31

Source: Statistics Indonesia, 2010 & 2016

It is estimated that there are 5.8% of the urban population without access to improved drinking water source, while for the rural area this number is bigger, accounting 20.5% from the population. In the sanitation sector, there are 27.7% of the population in urban area and 52.5% of the rural population considered without access to improved sanitation facilities (CIA, 2016).

2.2. Water Resource

If we only consider the total volume of freshwater in Indonesia, this country is a water rich country, with the average of annual water availability is 25 times than the world average (UN, 2004). Even though the water is abundant, Indonesia still faces water scarcity problem, which caused by uneven distribution of water availability among the islands especially if we compare this with the population in each island (see Table 2.2). Limited storage and the presence of variation in rainfall pattern based on season and spatial variation also contribute to the water scarcity in the country (FAO, 2012; ADB, 2016). Comparison between water potential and utilized water is presented in figure 2.2

Table 2.2 Water availability in Indonesia.

Island	Area	Precipitation		Internal renewable surface water and groundwater resource (km^3/year)	
	1000 km^2	**mm/year**	**Km^3/year**	**IRSWR**	**IRGWR**
Sumatra	464	2600	1206.4	481.4	85.8
Java	132	2600	343.2	125.6	25.6
Nusa Tenggara	73	1500	109.5	37.1	1.5
Kalimantan	572	2800	1601.6	594.2	125.1
Sulawesi	168	2100	352.8	177.1	16.6
Maluku	75	2200	165.0	63.5	5.9
Papua	421	3200	1347.2	493.7	196.9
Total	1905	2700	5125.7	1972.6	457.4
Overlap between IRSWR and IRGWR				411.7	
Total IRWR				2018.3	

Source: FAO, 2012

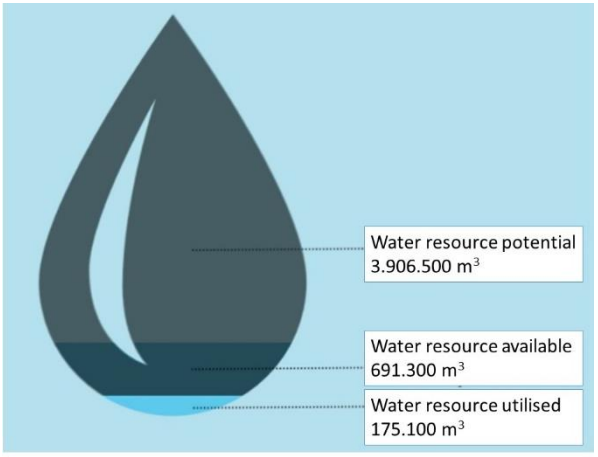


Figure 2.2. Comparison of water potential and utilised water.
(MoPW, 2016)

2.3. Water and Wastewater facilities in Indonesia

Water supply and wastewater facilities services in Indonesia comprises of several forms which operated and regulated by different actors. Water supply provision and wastewater treatment facilities from the central and local

government has never been adequate to serve all the Indonesian population due to limited capital/investment, human resources, challenging geographical condition and rapid population growth (ADB, 2013; Santoso, 2015).

Mismanagement in the organisational bodies and corruption worsen the condition. Government limitations in managing the water and wastewater create opportunities for the private actors. For years, most people who live in the urban area needs to buy additional water for drinking and cooking. In other situation, where the access to clean water is non-existent, people build their own tube well, accessing the groundwater table (ADB, 2013).

For domestic wastewater, private companies serve assistance in building on-site wastewater system (septic tanks) as well as providing tanks to desludging the solid waste that accumulates in the on-site system. These kinds of practices sometimes applied without proper supervision and assistance from local government, resulting in several environmental problems due to unsustainable consumption and inappropriate sludge handling (ADB, 2016). A detailed explanation of conditions from each sector will be provided below.

2.3.1. Water Supply

There are several types of access to clean water in Indonesia and categorised as 'improved drinking water source' (UN, 2015). Patunru (2015) recognised different categories exist in a different institution for the same definition of 'improved drinking water source'. In his study, Patunru explains that *Badan Pusat Statistik* or Statistic Indonesia define 'improved drinking water sources' as water sources that come from retail piped water, meter piped water, rainwater, and pump/protected dug well/protected spring located no less than 10 meters away from the septic tank or sewerage. On the other hand, the category of 'improved drinking water sources' in Indonesia's Ministry of Health consist of protected sources of drinking water (including branded bottled water), located within 1 kilometer, with good quality (clear, odorless, no taste, colorless, foamless).

Despite the difference, all the drinking water sources could be separated into four categories presented in Table 2.3. Since 1990-2015, Indonesia Government has worked to meet MDG's: to halve the population without drinking water access. It is shown from the table that percentage of people

without safe access to drinking water has decreased from 25% in 1990 to 11% in 2015, however, the ratio of people with access to drinking water from piped onto premises showing a slow increase, especially in the rural area. The slow increase of piped water connection in the rural area indicates unmet challenges by the government of Indonesia to lower disparity in infrastructure development across the country (Patunru, 2015; Moersid, 2015).

Table 2.3 Drinking water coverage

Indonesia	Drinking water coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2015	1990	2015	1990	2015
Piped onto premises	25	33	2	9	9	22
Another improved source	64	61	59	70	60	65
Other unimproved	10	6	31	18	25	11
Surface water	1	0	8	3	6	2

Source: WHO/UNICEF JMP, 2015

2.3.2. Wastewater Management

Since the ministry of environment launched and started a monitoring program for industrial activities called PROPER, around 52% of pollutant load from industrial activities (include pollutants from industrial wastewater) has decreased (KLH-RI, 2014). Major polluter in Indonesian waterways comes from domestic activities (KLH-RI, 2014; ADB, 2016). Centralized wastewater treatment plant in Indonesia only cover less than 3% of urban wastewater, and there is no centralized wastewater treatment plant in the rural area (MoPW, 2015). In total, wastewater treatment facilities cover 61%, and most of it comprises of on-site facilities (septic tank). There are more than 70% of urban population and 40% of rural population using the on-site facility, detailed number presented in Table 2.4.

Table 2.4 Sanitation coverage

Indonesia	Sanitation coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2015	1990	2015	1990	2015
Improved facilities	61	72	24	47	35	61
Shared facilities	8	10	6	12	7	11
Other unimproved	12	5	21	12	18	8
Open defecation	19	13	49	29	40	20

Source: WHO/UNICEF JMP, 2015

Challenges in domestic wastewater management are greater than the water supply sector, this could be seen by comparing data from table 2.3 and 2.4, where the data shows sanitation coverage in total is lower than drinking water coverage. Even though there are 61% of households having access to improved facilities, less than 5% of the sewage treated safely (ADB, 2016). Another issue that should be taken into consideration is the condition of the septic tank itself and the lack of proper handling of sewage sludge from the septic tank. To prevent contamination, septic tanks should be lined properly and located minimum 10 meters from the water well, but this is not the case for most of the septic tanks built in Indonesia. Most of the septic tank build without proper lining in the bottom and more than 60% of the household located the septic tank within 10 meters from the water well. One factor that triggers this practices is the absence of local government regulation (ADB, 2016).

2.4. Indonesian Citizen and The Environment

Indonesia's Ministry of Environment (2013) stated that coastal water quality in several sampling locations contains phenol, ammonia, and Methylene Blue Active Substance (MBAS) which indicates pollution from anthropogenic activities. Ammonia and MBAS presence indicate that the pollutant comes from domestic activities.

Besides indications from water quality analysis, the physical appearance of household solid waste is very common in the coastal waterways. A similar situation occurs in most of Indonesian River, where the number of 'heavily polluted' river increases from the year 2009 to 2013. Indicators that exceed the limits in river quality are Biological Oxygen Demand (BOD) and the presence of Faecal Coliform. Based on the ratio of Biological Oxygen Demand on Chemical Oxygen Demand (BOD/COD ratio), it is concluded that most pollutant in the river come from domestic or household activities. This situation represents poor involvement of Indonesian citizen in conserving the environment, especially for water resource conservation. Lack of involvement and lack of awareness could be caused by lack of education. Further explanation about environmental education in Indonesia and Environmental awareness of Indonesian Citizen presented below.

2.4.1. Overview of Education in Indonesia

Attitude and behaviour of the citizen towards environment could be influenced by the educational background, especially by environmental education in the country (Eliam and Trop, 2014). Prior to the explanation of environmental education in Indonesia, the overall condition of education in Indonesia is explained to understand the general condition of the education system in the country.

2.4.1.1. Education System and Quality

The government of Indonesia has made 9 years of primary education as a compulsory education for Indonesian citizen, which consist of 6 years of elementary school (*Sekolah Dasar*) and 3 years of junior high school (*Sekolah Menengah Pertama*). Previously in the Soeharto era, the mandate for compulsory education only applied for 6 primary years in the elementary school. To support the implementation of the 9 years compulsory education policy, 20% of the national budget allocated for education, some of the budget spent for infrastructures as well as subsidising the compulsory education to make it tuition-free. However, the quality of the education itself is very poor (Suryadarma and Jones, 2012) and for several decades, it emphasized a traditional teaching techniques such as rote learning and dictates the teaching materials where the class activities is more in the form of 'teacher-centered activities' (Suryadarma and Jones, 2012; OECD, 2015). As a result of low education quality, Indonesia ranked second lowest (positioned at 60 among 61 other countries) on literacy score (Miller, 2016), while PISA score shows Indonesian student performance are below the OECD average (OECD,2015).

2.4.1.2. Environmental Education in Indonesia

Before the new curriculum takes place, environmental education in primary and secondary years was incorporated in another subject and in the informal sector, environmental education was actively provided by the NGO. The first formal institution to provide environmental education was the higher education, called as Environmental Study Center (ECS) and this was arranged to support the government and environmental ministry. More than 100s of ESCs existed in the state university, actively engaged with various program to maintain the balance between socio-economic development and environmental conservation (Nomura, 2008)

Boy and girl scout (*Pramuka*) and nature lovers group (*Wanadri*) were the first organisations with activities that executed in the natural environment, however, they don't have a similar aim with present environmental education. In the early 80s, nature lover group started to incorporate environmental conservation to their activities. *Jaringan pendidikan lingkungan* (Environmental Education Network) established in 1996, this network initiated environmental education activities across the nation (Nomura, 2008).

Despite the presence of environmental education in Indonesia, a recent survey by statistic Indonesia shows around 91% of Indonesian citizen never involved/attended training for environmental conservation and from 3 % who attended training, 47% of the training was about solid waste management. Only 9 % who attended training was trained for water conservation (Statistic Indonesia, 2014).

2.4.2. Environmental Awareness of Indonesian Citizen

Environmental awareness of Indonesian Citizen was surveyed by Statistic Indonesia in 2013. The survey consists of several environmental aspects, and this part will only cover the water aspect. Awareness and behaviour assessed in the survey limited to water utilisation. Based on the survey, 29.58% household in Indonesia owns permeable area to infiltrate rain water, where the percentage of infiltration area in the rural household is greater than the urban household. Analysis on the report mentioned the limited size of the household area and limited knowledge as the factors that influence low numbers of infiltration area in the household.

Several water conservation practices such as turning off the tap to prevent water wastage as well as greywater reuse also observed by the survey. The result from the survey shows 81% of the population never let the water wasted. However, 87% of the population never reuse the greywater. 28.26% of population try to reduce water consumption in a recent year. The main reason for consumption reduction: money saving. Environmental reason: 5.47%. The report suggest intervention from government and provision of water saving infrastructure to foster water conservation practice.

2.5. Household Activities and Their Impacts on Water

Regardless the small fraction from total water consumption of all sector, domestic water consumption is important to be considered due to existed constraints and challenge to provide water supply such as limited budget, especially in the developing country context. The importance of including domestic water into water conservation strategy also because of its direct interaction with human life (Maliva and Missimer 2012). This section will try to explain general activities in the domestic area which involve water and therefore affect its quantity and quality, both directly and indirectly.

2.5.1. Direct impacts

Water consumption for daily household activities involves activities related to personal hygiene and health. For Indonesia context, application of water efficient devices such as low flush toilet, shower head and washing machine is very low (Statistic Indonesia, 2014), to add more variable, the culture of taking a bath using water bailer considered more water consuming (Statistic Indonesia, 2014). Indonesia placed as the 9th country with largest groundwater extraction, where 93% of the groundwater extraction in Indonesia is for domestic activity (Margat and van der Gun, 2013). Unregulated, unsustainable consumption, causing groundwater depletion which leads to saltwater intrusion and land subsidence in the capital city of Indonesia (Pemprov DKI, 2015), similarly, impact of groundwater depletion experienced by Bandung and Semarang, however the problem of groundwater's' over-exploitation happening in most urbanized area in Indonesia (ADB, 2016). In other parts of the world, unsustainable consumption of piped connection lowered the efficiency of water utilities to serve their consumer since the quantity of water consumption is increased as the consumer received pipe connection (Florke et al., 2013; Fan et al., 2014)

Water consumption in the household eventually generates wastewater. Without adequate wastewater facility and solid waste management, domestic activity contributes to water pollution. Improper methods of solid waste disposal such as open dumping and open burning will contaminate the groundwater (Barcelona et al., 1990) Several water contaminants that come from domestic activities, as well as individual consumptions, are phosphorus (P), micropollutants from home and personal care products and primary microplastic.

Phosphorus in the form of sodium tripolyphosphate usually included as an ingredient in household detergent, this form of phosphorous may exist in the domestic effluent (with percentage up to 50%) and highly associated with eutrophication (Gilbert & De Jong, 1978; Pattusamy et al, 2013). A study about P loading from several home products containing P in the UK found that regular dishwasher detergents in the UK market have the highest concentrations compared with other cleaning products (S. Richards et al, 2015).

The presence of micropollutant as a side effect of chemical consumption in our daily activities became an interesting research topic in recent decades due to its occurrence in the environment which pose risk to human health and aquatic life. Consumption of pharmaceutical and the usage of home and personal care products are few example of the activities which release the micropollutant to the environment. Considering the limitations of existing wastewater treatment plants, involvement and awareness of the consumers need to be raised if the issue wants to be addressed by integrated approach (Schirmer & Schirmer 2008). Another pollutant that needs to be considered is microplastic - especially primary microplastic, due to its presence in cosmetic and personal care products as spherical beads or scrubs. The size of microplastic is around <5mm – 1 mm, therefore it could not be captured or treated by wastewater treatment plant and released into the water bodies (Crawford & Quinn, 2017)

2.5.2. Indirect impacts

Individuals who live in the household constantly consume food and other products which produced by other. In this industrialized era, a lot of consumer goods produced by industries. Production of food and other consumer goods involves raw materials, energy and water. However, the presence of water along the production step or along the supply chain is rarely acknowledge by people. Water footprint is a multidimensional indicator that helps people understand how much water that is involved (consumed and polluted) to produce certain product, the indicator was developed based on a theory of ‘virtual water’ which invented by Tony Allan (Hoekstra et al, 2011). The presence of ‘water footprint’ or ‘virtual water’ study enable consumer to understand that 92% of the water is used for food production (waterweeat.com).

2.6. Water Literacy

During the initial phase, this study uses 'water conservation education' as a keyword to find supporting research and literature, resulting in a large amount of reading list. However, the condition showed opposite result when the keyword changed to 'water literacy'. There is few academic research work on the topic of 'water literacy', and the number of researches which fit this study narrowed down into two researches. The first one is a research about community knowledge in Australia by Dean et al (2016) and the second one is a research on water literacy and citizenship in the United Kingdom by Wood (2014). The paper of water related knowledge in Australia by Dean et al does not describe 'water literacy' but the study itself linked with an initiative to explain 'water literacy' of Australia citizen. The second research (which actually held earlier) dedicate one section to describe the water literacy concept as well as summarising the previous study and work on the topic of water literacy. Outside the academic world, the term of water literacy used by several organisations, such as Water Literacy Foundation (Karnataka, India), Alliance for Water Education (California, US), Ripple Effect (New Orleans, US), Alberta Water Council (Alberta, Canada) and Amrta Institute (Indonesia). Among these organisations, the work on water literacy by Alberta Water Council is the closest one regarding its type of research (objective and target group).

Originally, the word "literacy" is being used to describe ability and skills related to reading and writing; however, it is also used in another context as a metaphor for defining basic ability or competence in other domains (UNESCO, 2004). Considering few works in academic field regarding water literacy, clear and uniform definition of the term is unavailable; on the other hand, the term 'environment literacy' firstly used by Roth in 1968. Thus, water literacy is considered as derivation from this term, therefore, the definition of water literacy mainly refer to the definition of environment literacy (Wood 2014, AWC 2016). Water literacy covers basic knowledge of water sources and other aspects that interconnected with it (management and related issue), and being water literate means having a basic understanding of how to use or manage the water sustainably as a manifest of understanding the importance and significance role of water in life (Allianceforwatereducation.com, 2012; Wood, 2014; AWC 2016)

3. Methodology

Methods to understand the water literacy in this study were by executing three kinds of activities which depicted by Figure 3.1. Explanation of each activity provided in the sections of this chapter.

Figure 3.1 Methodology

3.1. Questionnaire Development

A questionnaire was made to assess water literacy in this study. The questionnaire design was based on previous national survey (*Indikator perilaku peduli lingkungan hidup*) as well as previous studies regarding water related knowledge, awareness and practices (Dean et al, 2016 and Tong et.al, 2016). Summary of survey and studies presented in Table 3.1

Table 3.1. Summary of previous studies

Title & Author	**Number of samples**	**Method**	**Questions Types**
Indikator Perilaku Peduli Lingkungan Hidup 2013 by Statistics Indonesia (2014)	75000	Direct interview	1.Water saving behaviour (5 items) 2.Knowledge on water saving (2 items)
Community Knowledge	5172	Online	15 Questions of water related

Title & Author	Number of samples	Method	Questions Types
about Water: Who Has Better Knowledge and Is This Associated with Water-Related Behaviors and Support for Water-Related Policies? by Dean et al (2016)		survey	knowledge, which consist of: 3.Influence of household activities on water quality, 4.catchments and the urban water cycle, 5.water treatment Response recorded using 5 point Likert scale and multiple choice
*Water conservation awareness and practices in households receiving improved water supply: A gender-based analysis. b*y Tong et al (2016)	612	Direct interview	1. Attitude towards conservation (6 items), 2. Expected results (4 items), 3. Individual behaviour control (2 items), 4. Social norms (2 items) 5. Water conservation practices (11 items) Response recorded using 5 point Likert scale

In this study, water literacy of individual measured by three categories of questions (see Table 3.2): knowledge and perception (KP), awareness (AW) and water related behaviour (WRB). The water-related behaviour included in the survey to understand the education prioritisation on household water conservation practice.

The experience of water problem and experience of water saving practice in the family was asked under the category of FOER, which consist of 15 questions in total. FOER questions were asked to understand the relationship of experience and behaviour. The final score of the water literacy calculated by summing up all the score in three categories and multiply it with the

weight, and the total maximum score for water literacy is 100. List of questions provided in the survey is attached in Appendix 3.

Table 3.2. Summary of water literacy measurement categories

Category	No. of Questions	Question types	Weight
Knowledge and Perceptions (KP)	6	3 questions to measure water-related knowledge with multiple choice answer and 3 questions to measure positivity towards water conservation with 5 points Likert scale (Agree - Disagree)	25%
Awareness (AW)	27	Questions related to awareness on water conservation with multiple choice to answer	25%
Water-related behaviour (WRB)	17	Multiple choices on water-saving behaviour and pollution prevention	50%

3.2. Data Collection

Data collection was executed from May to June 2017, by administering an on-line survey. Data collection using on-line survey is categorised as non-probability sampling method. The survey platform used was typeform.com, and platform to spread the survey was social media platform (Facebook, WhatsApp and Instagram).

Each participant was asked to spread the survey in their on-line network, and rewards were provided for 5 highly active respondents in terms of forwarding the survey or recruiting another people to fill the survey. Before completing the survey, respondent was asked to fill the identity of person who advertise the survey (social media account or phone number which inform them about

the survey). Mechanism used in this study to spread the survey could be categorised as snowball sampling method. In snowball sampling, each unit or each respondent give recommendation to the interviewer or survey administrator to reach another participant.

An on-line survey was conducted to ensure that participant comes from middle-income households, considering that internet user in Indonesia (especially social media user) mainly from the targeted group category. Middle-income individuals were chosen as target for this survey to ensure that respondents are people with access to clean water and sanitation facilities.

Initially, the survey was only distributed in two women-only, on-line communities, however, due to small response rate, the survey then spread in other social media platforms. Consideration to spread the survey in women-only communities was based on the objective of the study in the initial phase: to understand water literacy level of women.

3.3. Data Analysis

To understand the survey result, data were coded, compiled and analysed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 24. Microsoft Excel is a software made by Microsoft corporation, which provide spreadsheet and has capability to help user compile data and apply several simple statistical analyses. However, Microsoft Excel ability is limited, therefore, this study also use IBM-SPSS to apply descriptive analysis to the data. Analysis applied was descriptive analysis, considering the need or objective of this study, as well as the data type. The data was collected using non-probability sampling method, which could only be analysed using descriptive analysis because the sample is not a representative of the total population.

4. Result

4.1. Participants profile

Total participants are 463 persons which comprises of 289 Women (62.4%) and 174 Men (37.6%). 56.2% of the respondents' age are in the range of 25 to 34 years old, details on distributions of respondents based on age classification depicted in Figure 4.1. 72.1% of the participants are married with average number of child in the family are 2 (mean 1.89 $\pm$ 0.056).

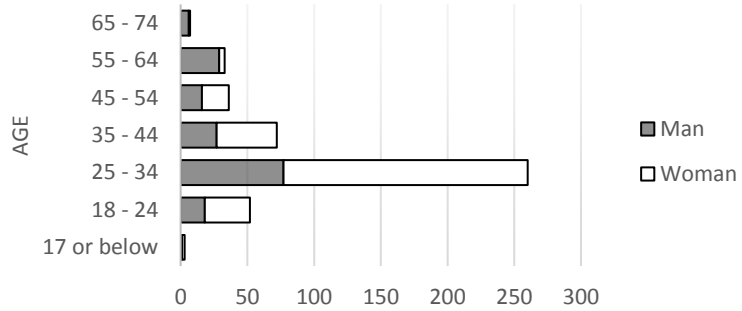


Figure 4.1. Age distributions

Figure 4.2 shows that most of the women respondent's occupation is housewife, while majority of the working men and women are working for private companies. Figure 4.3 shows that majority of the participants received education degree beyond high school (57.5% bachelor's degree and 22.7% master's degree).

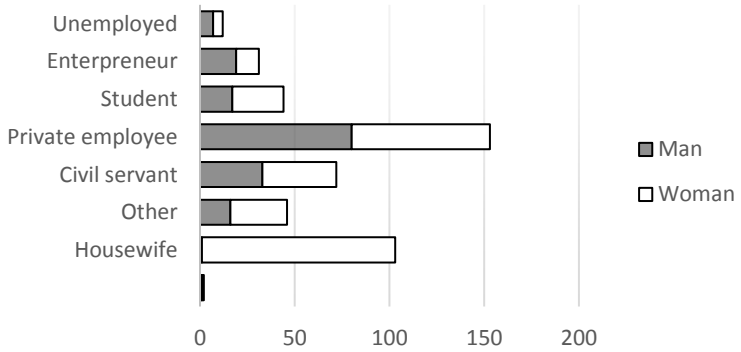


Figure 4.2. Occupation

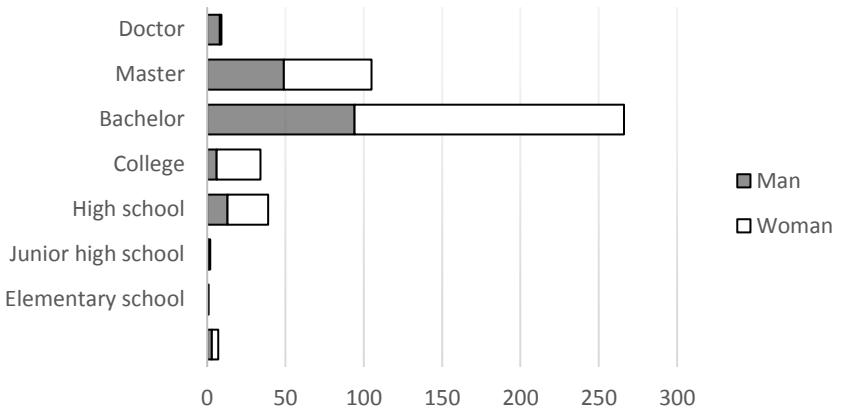


Figure 4.3. Education background

Responses are from all over Indonesia, account for 22 provinces out of 34, however 88.8% of the participants lives in Java Island. Provinces where the respondents live marked with grey colour and depicted in Figure 4.4. In the survey, the respondents were asked to specify their location (city name), however most of the respondents forgot to type 'city' or 'regency' information, therefore there is no information of rural and urban percentage.

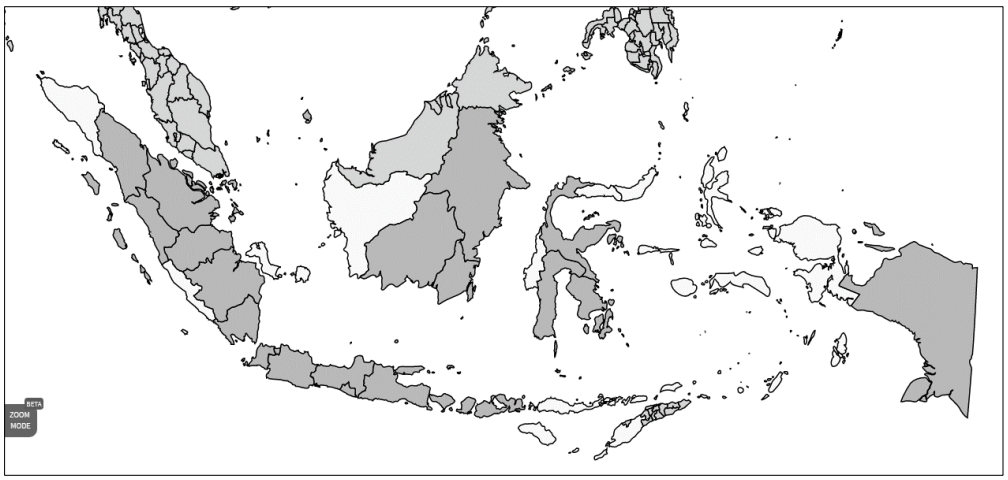


Figure 4.4. Respondents location based on Provinces (Mapchart.net,2017)

4.2. Housing condition

Most of the respondents lives in privately owned housing (29.6% family-ownership, 53.8% self-ownership) with mean for number of person in the household is 4.29 (4.29 $\pm$ 1.75). 71% of the respondents live in the house with solid waste pick-up facility. 54.4% of the respondents use groundwater as water source for hygiene activities while for consumption activities 43.4 % of the respondents use bottled water (for drinking and cooking). Graphical information of user percentage for each type of water source presented in Figure 4.5.

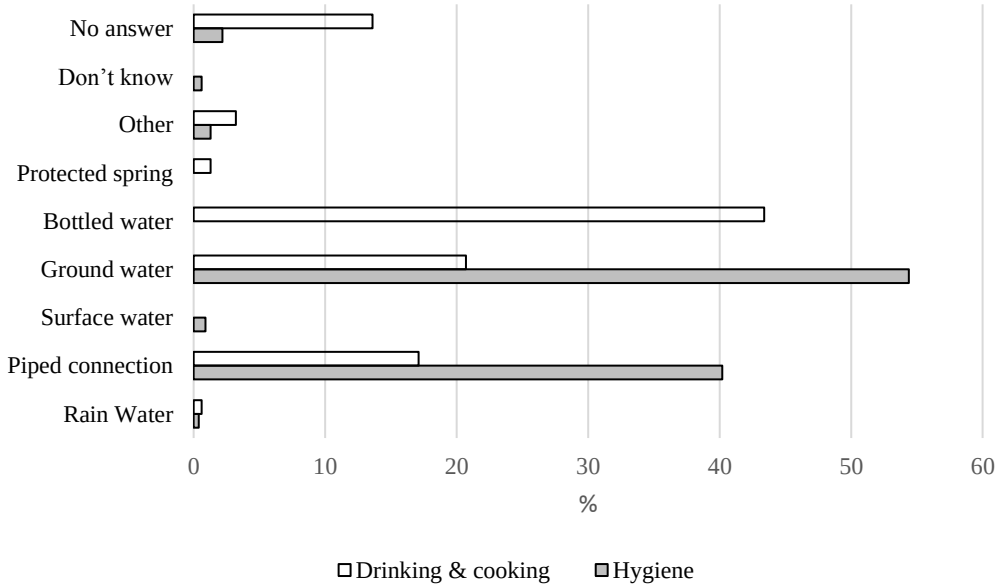


Figure 4.5. Water Source for Drinking, cooking & hygiene

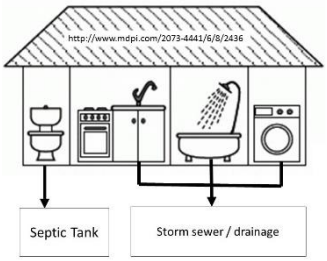
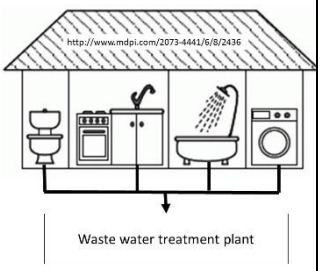
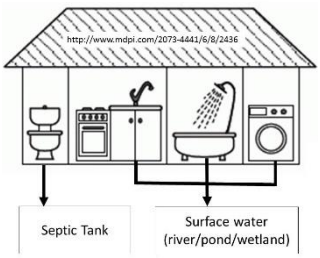
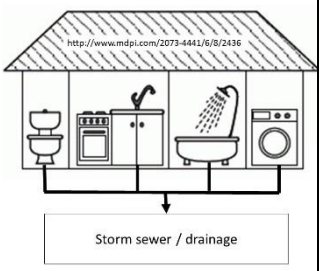
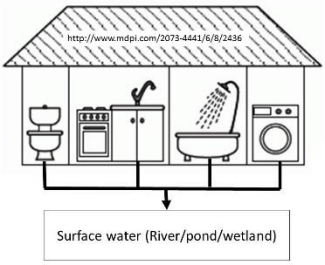
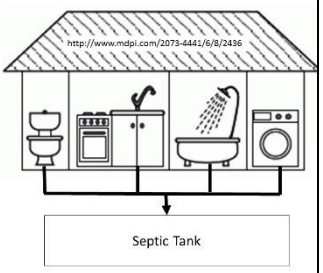
4.3. Water consumption behaviour

Water consumption of piped connection user varied greatly from 6 m^3/month to 300 m^3/month with monthly water billing variation from IDR 16.000 to IDR 1.500.000 (SEK 10 to SEK 1000). No data available to know how much water consumed per month by groundwater user, due to non-availability of water meter.

4.4. Household wastewater management

73% of the respondents live in a house with on-site wastewater system (septic-tank) to treat sewage from toilet, while the greywater is flowing to the environment (through storm sewer or directly goes to the river) without treatment. Only small portion of the respondents' house connected to waste water treatment plant (1.5%) or even having no treatment at all (2.8% wastewater goes directly to surface water and storm sewer). Detailed information presented in Table 4.1

Table 4.1. Wastewater arrangement in the household

Wastewater Arrangement	%	Wastewater Arrangement	%
 Toilet with septic tank; greywater to storm sewer	61.8	 Wastewater to WWTP	1.7
 Toilet with septic tank; greywater to river	5.8	 Wastewater to storm sewer	1.3
 Wastewater to surface water (river/pond/wetland)	1.5	 Wastewater to septic tank	5.4

4.5. Water pollution potential

Certain products which consumed and applied in domestic activities have potentials to pollute the water, therefore the survey asked respondent about their behaviour towards the usage of cooking oil, used medicine, as well as personal care products with scrub. Based on the survey, 62% of respondents (n=287) throw their used medicine to the garbage disposal (215 received solid waste pick up, 72 without solid waste facility).

Survey result shows that 27.4% of respondents use personal care products with scrub, however the potential of water pollution from the scrub depends on the product brand, since not all the scrub is micro plastic. Survey recorded 45 different brand products with scrub used by the respondents (Appendix 2), with 3 brands used by more than 5 users (Biore = 17 users, Ponds = 12 users, Wardah = 8 users).

42.1% of the respondents cooks their own meal every day and 99% of people who cook, use oil for cooking (n=358). 33.9% of respondents throw their used cooking oil to the kitchen sink Another method of used cooking oil disposal and their frequency presented in Table 4.2.

Table 4.2. Methods of used cooking oil disposal

Methods of used cooking oil disposal	%
To river / swamp /wetland	.6
To soil in the backyard	5.2
Collected in bottle, thrown together with other household waste	20.7
Collected for other purpose	12.3
Other	4.8
To kitchen sink, with running water	19.9
To kitchen sink with running water and soap	14.0
No answer	22.5
Total	100.0

4.6. Water Related Knowledge & Perception

Mean score of total 463 respondents is 2.43 (equivalent with 41% correct answer). Mean score for women group is lower than men, mean score for women is 2.32 while for men it is 2.61. Comparison of mean score between groups with different education background as well as occupation presented in Figure 4.6 and 4.7, while complete comparison that includes gender, education background and occupation presented in Appendix 1.

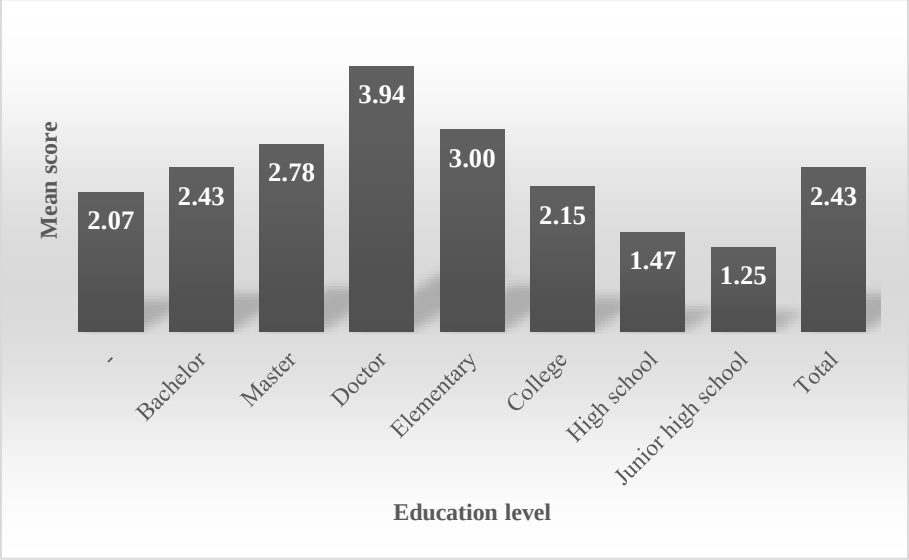


Figure 4.6. Knowledge score based on education level

Figure 4.6 shows that mean score for people with doctoral degree is highest among another education background, the mean score increases in accordance with higher education level (with exception for 1 respondent with elementary level of education). From Figure 4.7, mean score of housewife, student and unemployed groups are lower than the total mean score.

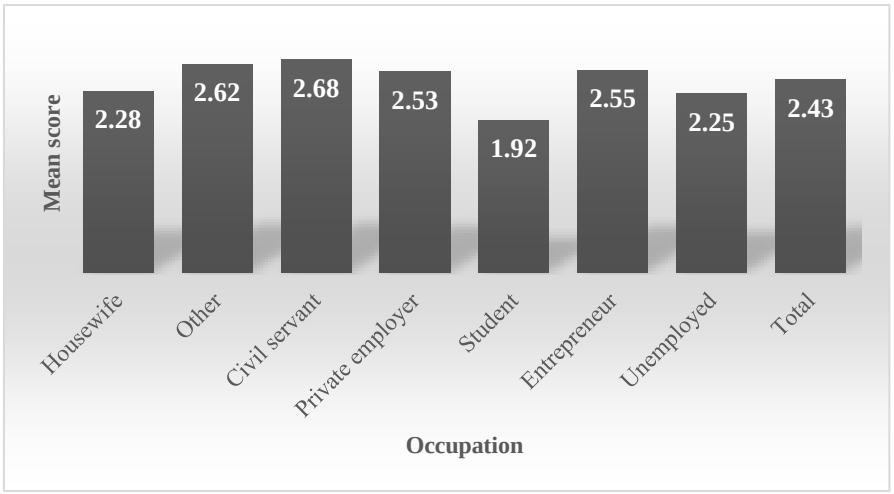


Figure 4.7. Knowledge score based on occupation

Frequency of correct responses for questions on water related knowledge presented in Table 4.3. Frequency of correct answer from women always lower than men, for questions related with basic facts of water. However, for water related perception, frequencies of positive response for women and men differ slightly.

Table 4.3. Detail of correct answer for water related knowledge

		Frequency of Correct answer		
No.	Questions	Men	Women	Total
1	How much water is on earth, that available for human consumption? (percentage of fresh water)	34%	21%	26%
2	Most of the fresh water stored in?	11%	8%	9%
3	Do you think that the total water volume on earth will changes trough time?	41%	26%	32%
4	Household/domestic activity does not contribute to water pollution	49%	47%	48%
5	Water conservation activities at home will give significant impact for the environment	76%	79%	78%
6	Citizen could make contributions in water pollution prevention	79%	78%	79%

4.7. Awareness

Mean score of total 463 respondents for awareness category is 45.5 (equivalent with 45% correct answer). Mean score for women group is lower than men, mean score for women is 43.9 while man is 48.39. Comparison of mean score between groups with different education background as well as occupation presented in Figure 4.8 and 4.9, while complete comparison that includes gender, education background and occupation presented in Appendix 1a.

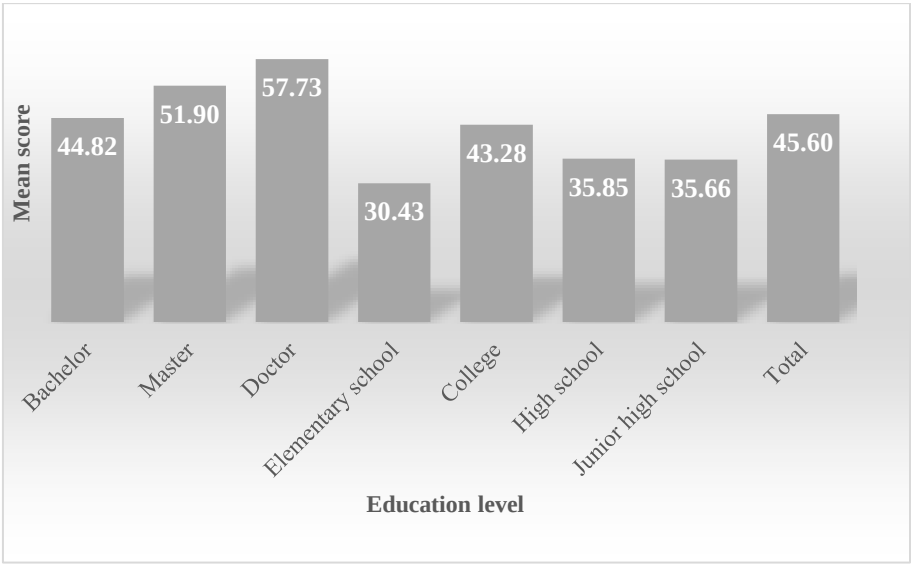


Figure 4.8. Awareness score based on education level

Figure 4.8 shows that mean score for people with doctoral degree is highest among another education background, the mean score increases in accordance with higher education level. From Figure 4.9, highest mean score for awareness category is from people with undescribed occupation (other). Meanwhile, score of housewife, student and unemployed groups are lower than the total mean score.

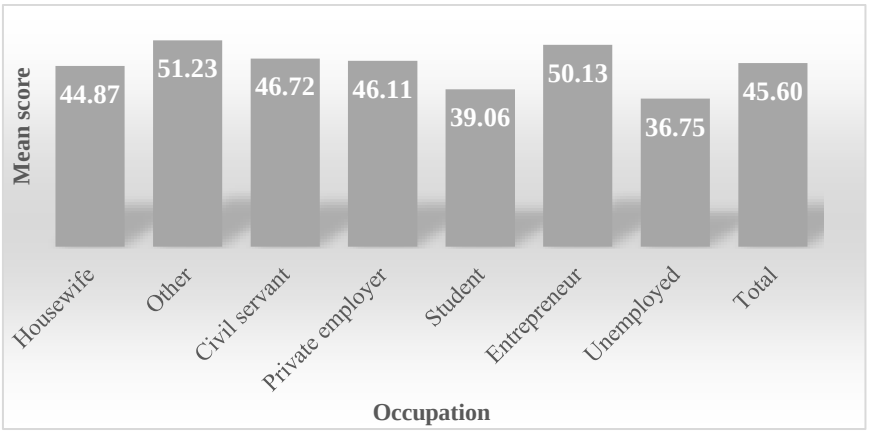


Figure 4.9. Awareness score based on occupation

Graph in Figure 4.10 shows that for general question on awareness, only 3 out of 8 questions received correct responses from more than 50% of the respondents (AW 10 -wastewater arrangement, AW 24 & AW 23 disposal of used medicine). 5 other questions which received correct responses lower than 50% are questions related with solid waste sorting, micro-plastic, water footprint, priority concern when buying home & personal care product (AW18, 28, 27, 26, 25)

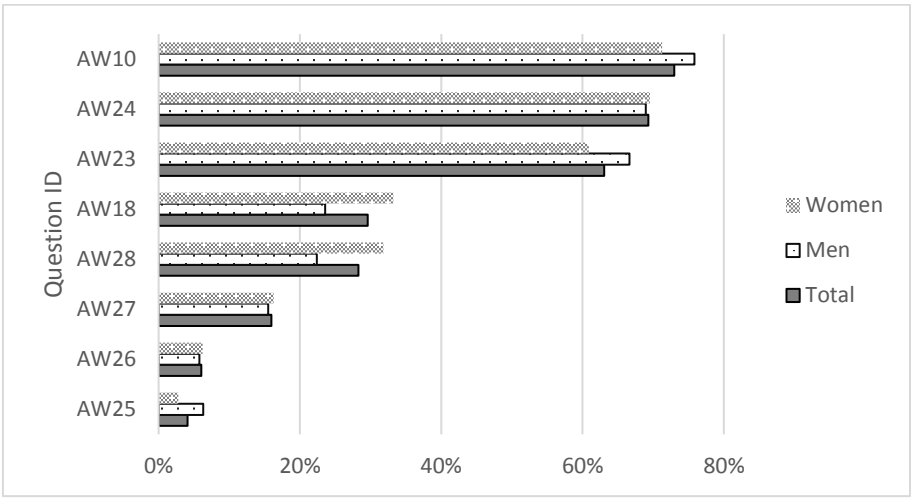


Figure 4.10. Detail responses for general questions on awareness category

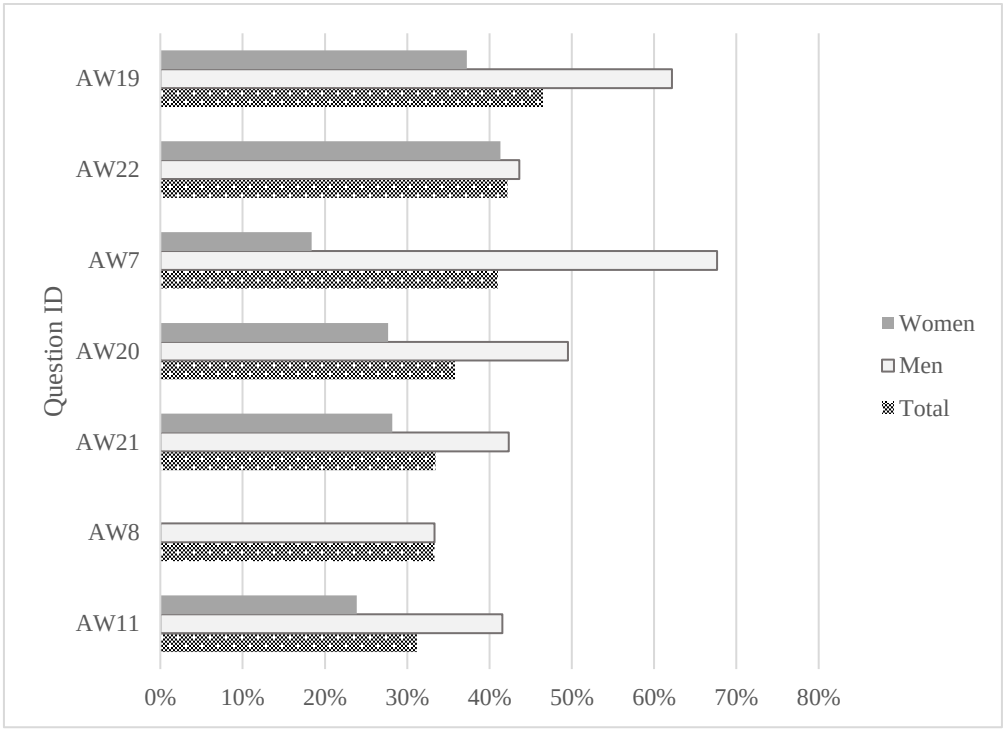


Figure 4.11. Detailed responses for user specific questions on awareness category

Graph in Figure 4.11 showing responses for user specific questions. For this type of questions, the graph only shows result for question with correct responses from less than 50% of the respondents. Most of the responses shows that higher awareness comes from men. Questions presented in the graph are question related with laundry machine user (AW19, 20, 21), cooking oil user (AW22), fish pond owner (AW7) swimming pool owner (AW8) and piped water user (AW11).

4.8. Water Related Behaviour

Mean score of total 463 respondents for water related behaviour category is 37.52 (equivalent with 37% correct answer). Mean score for men is lower than for women, mean score for men is 36.67 while women is 38.03. Comparison of mean score between groups with different education background as well as occupation presented in Figure 4.12 and 4.13, while complete comparison that includes gender, education background and occupation presented in Appendix 1a.

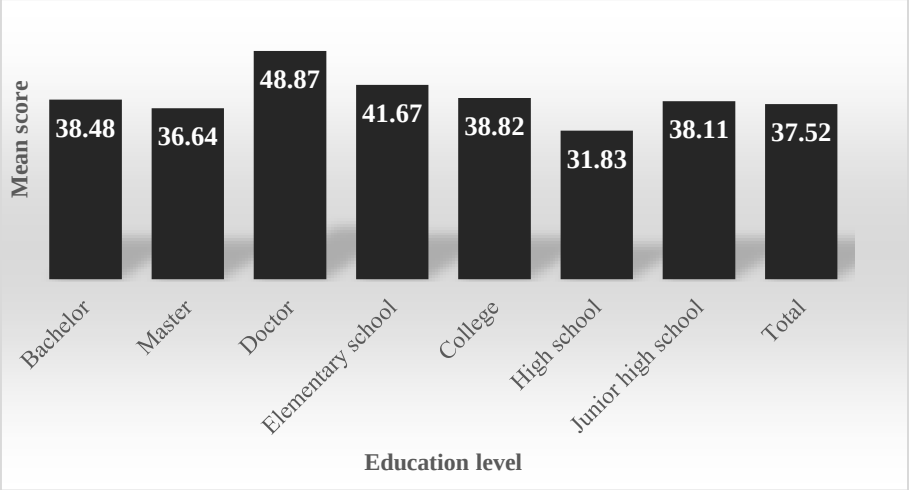


Figure 4.12. Behaviour score based on education level

Figure 4.12 shows that mean score for people with doctoral degree is highest among another education background, however, the mean score does not seem to follow increasing pattern in accordance with education level. From Figure 4.13, highest mean score for behaviour category is from people with undescribed occupation (other), while the lowest mean score for behaviour category is from student.

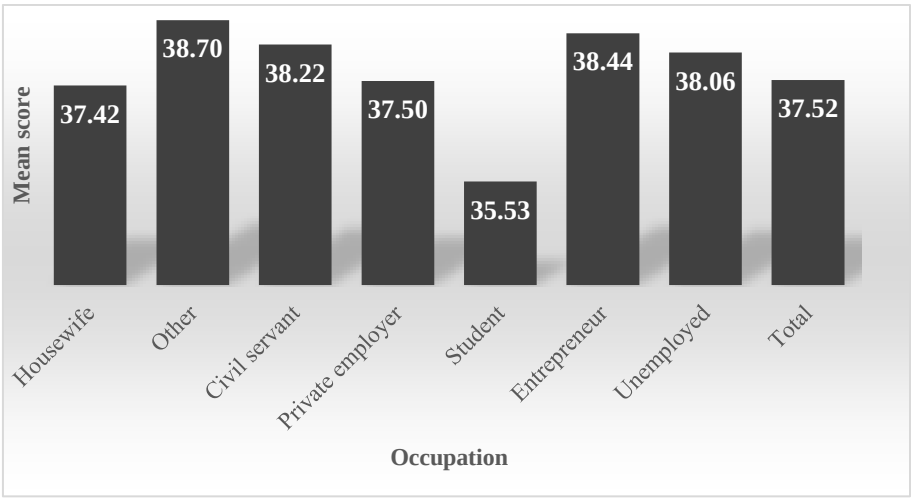


Figure 4.13. Behaviour score based on occupation

Graph in Figure 4.14 shows that for general question on behaviour, only 2 out of 8 questions received responses from less than 50% of the respondents (WRB17 -food waste, WRB11 water efficient dishwashing practices).

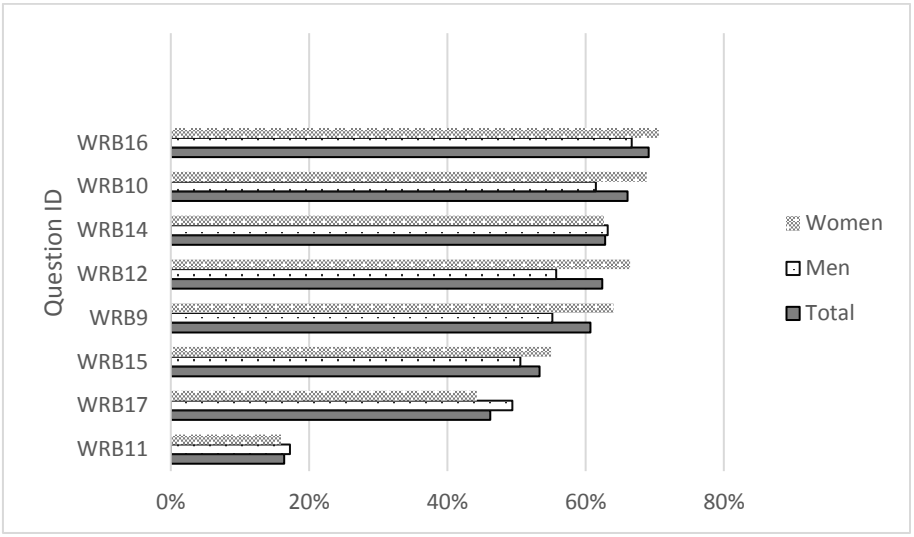


Figure 4.14. Detail responses for general questions on behaviour category

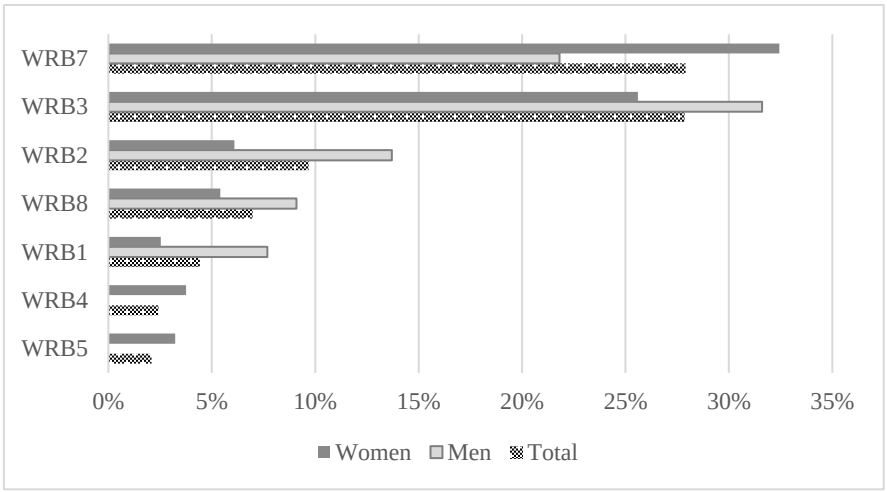


Figure 4.15. Detail responses for user specific questions on behaviour category

Graph in Figure 4.15 showing responses for user specific questions. For this type of questions, the graph only shows result for question with correct responses from less than 50% of the respondents. Questions presented in the graph are question related with shower user (WRB3, 7 & 8), garden and plant owner (WRB1&2), and water bailer user (WRB 4 & 5).

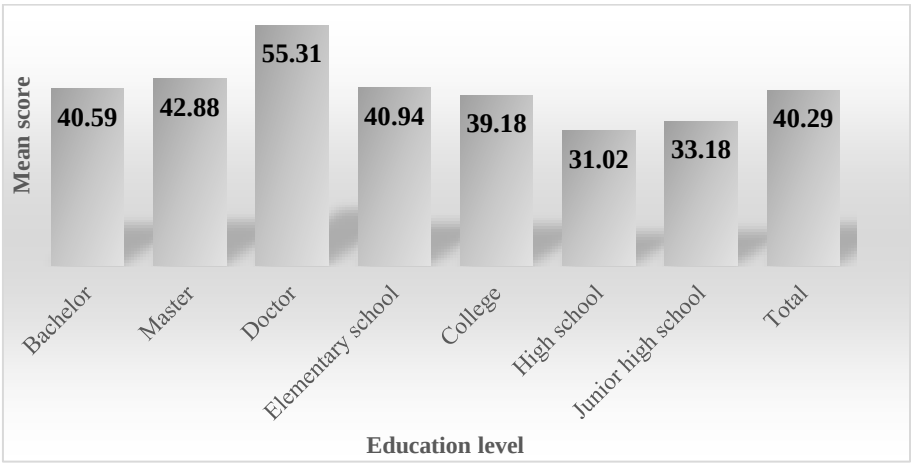


Figure 4.16. Water literacy score based on education level

4.9. Water Literacy Score

Mean score of total 463 respondents for water literacy is 40.29 (equivalent with 40% correct answer). Mean score for women group is lower than men, mean score for women is 39.67 while men is 41.3. Comparison of mean score between groups with different education background as well as occupation presented in Figure 4.16 and 4.17, while complete comparison that includes gender, education background and occupation presented in Appendix 1a.

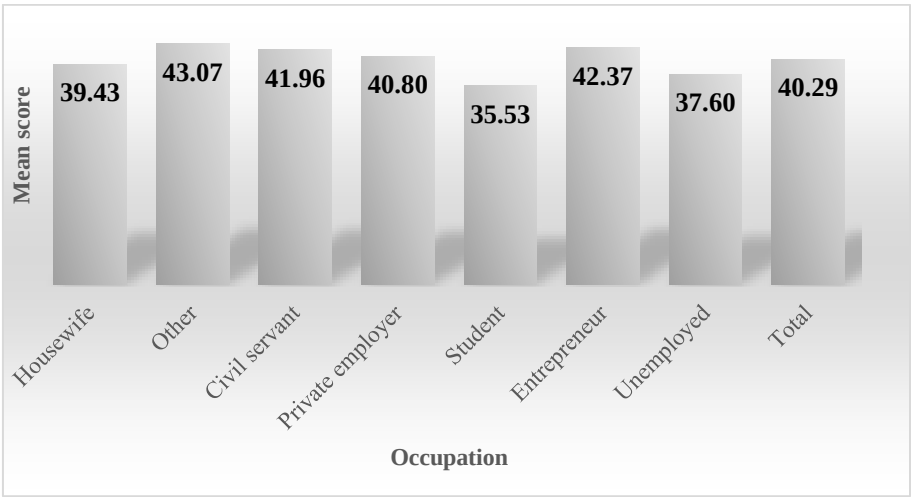


Figure 4.17. Water literacy score based on occupation

Figure 4.16 shows that mean score for people with doctoral degree is highest among another education background, the mean score increases in accordance with higher education level. From Figure 4.17, highest mean score for water literacy is from people with undescribed occupation (other), while the lowest mean score for behaviour category is from student.

5. Analysis & Discussion

All the analysis for the survey result was done by combining result from literature study and statistical analysis using SPSS version 24. Statistical method used in this study is descriptive statistic, by presenting frequency and mean score for each category which composed the water literacy score. Decision to use descriptive analysis method is based on the study's objective: to understand which household activities and which water literacy topic should be prioritized to be presented in education material for household level. Limitation of descriptive statistic is that the result only applies for the studied samples, thus, result from this study could not be used for generalisation.

5.1. Analysis on respondents' profile

1. Considering the educational background and the housing status of the respondent, it could be concluded that the survey participants were mostly from middle income families. This is proven by high percentage of people who received education level higher than high school (80.2%). Attendance in secondary education level shows higher income status, since free education in Indonesia is only cover for education until junior high level. Middle income level also marked by high percentage of housing ownership (83.4%).

2. The presence of middle income individuals as participants in the survey confirms the effectiveness of using on-line survey to reach middle income class. Even though the internet nowadays could be accessed by people from lower economy, the survey platform (typeform.com) which use special graphical feature needs constant and stable internet connection to complete the survey.

3. The importance of receiving response from middle income individuals in the survey is because the target group assumed to have better access to water. People with better access to clean water as well as better economic condition will have higher chance to participate in a sustainable water management, but the probability of involvement might depend on the prior knowledge.

4. Understanding knowledge level, or water literacy level of middle income citizen will be beneficial as a foundation for sustainable water management in the future, not only because of the positive aspect of involvement, but also because of the negative aspect which will potentially occur due to insufficient knowledge. Unconscious, unaware consumer has a bigger potential to contribute to water pollution, as well as causing unsustainable consumption.

5. Middle income level individuals were also made as target in the study, considering that they have lower barriers to adopt water conservation practices or adjusting to new lifestyle which minimise pollution, due to their ability to receive new information based on educational background. In short, they have better ability to adapt with new measurement than people who have problem with economic condition and lower education background.

6. Another important reason to study water literacy of middle income individuals is because middle income population in Indonesia is increasing every year. In 2013, the population of middle income individuals are 56.5% of total population (Widiatmanti, 2015).

5.2. Analysis on Survey design & Administration

1. Very few study in academic world working on the topic of 'Water literacy' while in the topic of 'water conservation', most of the study work to understand motives and factor behind the application. Most of the study of water literacy or measurement of water related knowledge were applied in developed world, where the education background and the water and wastewater infrastructure condition is better than in developing country. Thus, this study is the first attempt to assess water literacy for developing country. However, due to its 'pioneer' status, this study has limitation regarding the 'water literacy' definition, which affect the questions' component to measure the water literacy level.

2. The survey was made using a website for survey called *typeform.com*. The reason of choosing the website is due to its user-friendly questionnaire builder with better appearance and feature compared with other on-line form. One of the special feature from *typeform.com* is "Logic jump". This feature will provide tailored questions based on response. For example, questions about water pump only valid for groundwater user, therefore if someone choose 'tap water/piped connection' as their water source, question of water pump will not appear in their questionnaire. However, this feature gave drawback when it comes to the analysis, because the logic jump made the respondents responses divided into several categories, therefore it took extra time to compile responses and calculate water literacy score.

3. Conducting survey with on-line platform is giving advantages such as enabling the involvement of large number of people from different islands in the survey, in very limited time. This is very helpful for an archipelago country like Indonesia. Administering on-line survey reduce the cost to visit different island to interview people.

4. Disadvantage of conducting on-line survey is related with the reliability of the answers provided by the respondents. To accept answers from behaviour and awareness category, it should be assumed that all respondents were giving honest answer based on their actual awareness and behaviour. The other disadvantage of using on-line survey is the limitation to measure water consumption behaviour.

5. Based on the report from *typeform.com* about the survey visitor and responses. The survey was visited by 1040 people (1040 unique visitors), 855 persons read the survey, but only 436 filled in the questionnaire. Several visitors who attempt to fill the questionnaire were demotivated due to problem with internet connection, some says that the questions were too many. This condition depicts the probability of future assessment. To increase the participation of filling the online survey, it is better to include the survey in an educational event (as a pre-test & post-test). During the study, survey was once distributed in an online forum/group which received

education material about water from the researcher. Response collected from the online group was 91 (from 136), or 67% from the total group member.

5.3. Analysis on Survey result

1. To understand and set priorities of education material related with water conservation, the survey covers three types of questions' category: water related knowledge, awareness and water related behaviour. From the survey results, there are three output that needs to be highlighted: 1) assessment on water related knowledge shows poor knowledge on the basic subject, 2) score for all categories mostly related with education background, 3) most of the time, mean score in men group is better than women. Possible reason behind lower mean score for women is related with higher number of women with occupation and educational background which produced lower mean score. For example, lower mean score produced by housewife and student for occupation category; and lower mean score also produced by people with junior high school and high school background for educational background category. If we check number of women in these groups, we could see that there are more women than men in these groups (see appendix 4).

2. The survey result that shows water literacy mean score increases as the education level increase also indicates that information regarding water related knowledge might only circulates in the groups of educated people. Factors that might influence this conditions: barrier of information due to lack of interest, presence of illiterate group, inefficient methods to inform people (unattractive educational material). The result might also confirm that water related information mainly provided in formal institutions.

3. Daily activities with possible contribution to deteriorations of waters' quantity and quality was examined under awareness and behaviour question. Considering majority of groundwater use by survey respondent, there is a need to conduct direct measurement of water consumption among groundwater user. Answers collected from the

survey does not clearly describe water wastage practice, however it indicates possible pollution problem from greywater.

4. Total response to questions about wastewater arrangement are 77.5%; this means that there are around 22.5% of respondents who did not answer and could be a representative for the number of people who don't aware about the wastewater arrangement in their house (among the respondents).

5. Even though 67.6% of the respondent installed on-site system, all the greywater will flow directly to the environment through storm sewer, thus, it is important to educate the home owner about environmental problem caused by greywater.

6. Greywater are usually coming from kitchen, laundry and showering/bathing activities. Examples of products related to these activities which may have pollution potential are dishwashing detergent, laundry detergent, scrub containing personal care products.

7. Dishwashing and laundry detergent usually contains surfactant, which most of the time composed of Phosphate. This component is one of the cause of eutrophication. Comparing with the report of water quality from SLHI, several lakes and river in Indonesia already in a hypereutrophic state. This confirms the needs of educating people to choose better products for dish washing and clothes washing. However, ingredients of the products sometimes not mentioned clearly in the packaging.

8. Issue of micro-plastic is not recognized for most of the participants. Considering that there are 27% of respondents who use products containing micro-plastic, it is important to inform consumer to be aware of the micro-plastic in their products. From 45 brands that recorded from the survey, there are 7 brands that contains scrub from micro-plastic, 2 of the brands are considered as favourite since they have more users than the other brand.

9. Survey result indicate potential pollution to water ways from used cooking oil, this is shown by 33.9% of respondents who usually

dispose their used cooking oil to the kitchen sink. Potential pollution of groundwater from used cooking oil also shown by the presence of people who still throw their used oil to the soil in their backyard (5.2%). Problem with used cooking oil may related with misperception among the people. There are certain people who thinks that proper way to dispose used cooking oil is by mixing it with detergent. They based their act by information received on science classes in the elementary school, which informs that oil and water will mixed after adding detergent into the solution.

10. Less than 10% of the survey respondents choose 'environmental friendly' as a priority consideration to choose home and personal care products. Together with question about used cooking oil disposal and question about micro-plastic issue, these questions received low response among the awareness category which indicate the need to include these topics to education material.

11. Under the category of water related behaviour, there is one question about dishwashing practice (WRB11) which received correct response from less than 20% of the respondents. Possible factor that affect low application of water efficient dishwashing method: 36% of Indonesian do the dishes without thinking about the technique and 31% do it like their parents do (Maitra et al, 2016). This result indicates the need to educate people on water saving dishwashing practice.

12. From the user-specific questions under the behaviour category, low response received for questions related with water efficient bathing and showering practices. This results confirms findings from previous national survey which showed low number of people who use shower in their bathroom. Possible reason behind are cultural background and form of adaptation to limited water infrastructure. Indonesian people mostly use water bailer for bathing and this practice is considered as the common practice. Historical background of collecting water from the well, bathing in the river, as well as unreliable water supply formed a common practice among the home owner to install a storage tub in the bathroom to store water. Unlike the developed country which serve and maintain constant pressurised water through the pipe, household connection in Indonesia often faces leak problems. Thus,

installing shower head in the house could not replace the convenience of using water bailer due to inconstant supply.

13. Questions about watering plant and garden received low response on correct answer. The question asked was about the watering plant frequency, correct answer for scoring was set for lowest frequency. Low response on low frequency indicates that majority of the plants owned by the respondent is still water consuming. Suggestions on choosing water efficient plant or water efficient plant-watering technique could be added to education material, to raise awareness on this topic.

14. Comparing the three categories which compose the water literacy score: knowledge, awareness and behaviour, it could be seen that mean score of behaviour category for all respondents has the lowest score. However, considering that mean score for all categories are below than 50%, it shows that overall score of water literacy components are low. This condition confirms the need of providing water education in the household level.

15. This study did not quantify the water consumption behaviour due to the limitation of on-line survey method. However, several questions related with water consumption activities (dishwashing & laundry activity and personal hygiene) shows responses which indicate the need to provide water saving education material in the household level. The importance of informing water saving technique is to reduce the probability of overconsumption in the future, especially if the middle-income individuals receive increases in income. If the increase in income does not accompanied by increase in water literacy, probability of unsustainable consumption of water will be high.

16. Considering the main role of women in managing household water, as well as nurturing and taking care of the children in the family, providing water-related education material for the household level will help future generation received enough ‘training’ from their mothers to become part in sustainable water management in the future.

5.4. Discussion

1. This study try to asses general overview on water literacy, therefore there are topics that not covered by this study, such as: questions about the presence of household assistant, consumption of cigarette, and product brand of dishwashing and laundry detergent.

2. In Indonesia, it is very common for middle income family to use the service of household assistant, thus, some of the activities related with water become responsibilities of the assistant. Water literacy of the household assistant could be assumed to be lower than the home owner considering their education background, however, it is better to include question about the presence of household assistant in the future. The information regarding household assistant will be beneficial to understand the potential of educating this group.

3. Consumption of cigarette in Indonesia is quite high, while the environmental awareness is quite low. Combination of these two will contribute to water pollution potential by the presence of cigarette butt in the water course. If the questionnaire will be improved in the future, it is important to include the question regarding cigarette.

4. Information regarding product brand for dishwashing and laundry activities will be beneficial to understand the potential pollution from phosphate containing products. This study excludes the question due to higher concern for microbeads, thus, suggestion for improvement for the survey in the future would be to include this question in the survey.

5. This study of water literacy among middle income individuals worked as preliminary study. To make the study result beneficial, next step is to conduct study in larger population or to make weighted analysis to draw conclusion for the whole middle income population.

6. Suggestion for further study:
    - in-depth study on existing education material in both developed and developing country, and provide method and education

material which readily available to be disseminates in household level.

- Assessment on the effectiveness of education material provided, which includes assessment of water literacy after the information received by targeted population.

6. Conclusions

1. The first objective of this study was try to assess water literacy level of Indonesian citizen which have access to internet connection, and assumes that people with access to stable internet are people from middle-income categories and have access to clean water and sanitation facilities. Based on the respondents' profile, it could be concluded that respondents involved in this study already fulfil the assumption. However, there are several limitations from this study which made the first objective is not fulfilled completely.

2. The survey results, especially the water literacy score, confirms the need of effective dissemination of water related knowledge in the household level. Even though this conclusion only applies for studied respondents considering the limitation of descriptive analysis used in the study, water literacy of middle income individual is important to be increased to prevent unsustainable consumption in the future.

3. 'How to conserve the water and protect it from pollution' should be considered as a 'life skill' and need to be done primarily for women in the household, considering their major role on household water management and their influences to future generation.

4. Products consumed in the household by the respondents with potential contribution to water pollution are cooking oil and personal care products containing micro-plastic.

5. Compiling from previous analysis of knowledge, awareness and behaviour questions, materials that needs to be included in the educational material to increase water literacy in the household level are as follow:
    a. Basic knowledge of water facts (importance of water, amazing properties of water, global water cycle & availability, global threats to water)
    b. Information of household impact to water quality and quantity degradation

c. Information of proper solid waste management and its influence to water environment (special information regarding phosphate, micro-plastic, proper disposal of used cooking oil)
d. Information of harmful substances in the home and personal care products
e. Water saving tips in the household
f. Information of water foot print and tips on how to reduce personal water footprint

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Appendix 1 – Knowledge Score

Comparison of knowledge score between different group (gender, education and occupation) presented in the table below. The table was made using crosstabulation feature in SPSS, however, there was no relationship test applied for the variables presented in the table (for example chi square test of independence). The purpose of presenting the table is to provide information for descriptive analysis

Report of Knowledge Score					
Knowledge score					
Gender	Education	Occupation	Mean	N	Std. Deviation
Men	N/A		0	1	.
		Civil servant	3	1	.
		Private company employee	3.5	1	.
		Total	2.167	3	1.893
	Bachelor	Other	1.938	8	1.741
		Civil servant	2.682	11	1.6167
		Private company employee	2.447	57	1.6789
		Student	3.7	5	2.5884
		Enterpreneur	2.65	10	1.7167
		Unemployed	3.5	3	2.1794
		Total	2.553	94	1.739
	Master	Other	2.667	6	1.0801

Report of Knowledge Score					
Knowledge score					
Gender	Education	Occupation	Mean	N	Std. Deviation
		Civil servant	3.115	13	1.6222
		Private company employee	3.031	16	1.7651
		Student	3.125	4	1.0308
		Enterpreneur	3.071	7	0.8864
		Unemployed	2.667	3	2.3094
		Total	3	49	1.472
	Doctor	Other	5	1	.
		Civil servant	3.917	6	1.3571
		Enterpreneur	4	1	.
		Total	4.063	8	1.2082
	College	Other	4.5	1	.
		Civil servant	2	2	2.8284
		Private company employee	1.75	2	2.4749
		Student	2	1	.
		Total	2.333	6	1.9916
	High School	Housewife	0	1	.
		Private company employee	1.875	4	1.493

Report of Knowledge Score					
Knowledge score					
Gender	Education	Occupation	Mean	N	Std. Deviation
		Student	0.75	6	1.1726
		Enterpreneur	2	1	.
		Unemployed	0	1	.
		Total	1.077	13	1.2885
	Junior high school	Student	0	1	.
		Total	0	1	.
	Total		0	1	.
		Housewife	0	1	.
		Other	2.563	16	1.6317
		Civil servant	3.045	33	1.6123
		Private company employee	2.531	80	1.6901
		Student	2.206	17	2.0771
		Enterpreneur	2.842	19	1.3749
		Unemployed	2.643	7	2.212
		Total	2.609	174	1.7092

Report of Knowledge Score					
Gender	Education	Occupation	Mean	N	Std. Deviation
Women	N/A		0	1	.
		Housewife	4	2	0.7071
		Private company employee	0	1	.
		Total	2	4	2.3452
	Bachelor	Housewife	2.375	60	1.4833
		Other	2.429	21	1.8593
		Civil servant	2.543	23	1.4135
		Private company employee	2.396	48	1.5977
		Student	1.625	8	1.5295
		Enterpreneur	2.5	8	1.488
		Unemployed	1.875	4	2.25
		Total	2.369	172	1.5603
	Master	Housewife	2.5	14	1.4412
		Other	3.167	9	1.5811
		Civil servant	2.3	10	1.6865
		Private company employee	2.867	15	1.8465

Report of Knowledge Score					
Gender	Education	Occupation	Mean	N	Std. Deviation
		Student	1.9	5	1.3416
		Enterpreneur	2.5	2	0.7071
		Unemployed	1	1	.
		Total	2.589	56	1.5843
	Doctor	Private company employee	3	1	.
		Total	3	1	.
	Elementary school	Private company employee	3	1	.
		Total	3	1	.
	College	Housewife	2.25	14	1.205
		Civil servant	2.2	5	1.5248
		Private company employee	2.75	6	1.0368
		Student	0	1	.
		Enterpreneur	0	2	0
		Total	2.107	28	1.3564
	High School	Housewife	1.5	12	1.0871
		Civil servant	0	1	.
		Private company employee	3.5	1	.

Report of Knowledge Score					
Gender	Education	Occupation	Mean	N	Std. Deviation
		Student	1.833	12	1.5859
		Total	1.673	26	1.378
	Junior high school	Student	2.5	1	.
		Total	2.5	1	.
	Total		0	1	.
		Housewife	2.304	102	1.4197
		Other	2.65	30	1.7867
		Civil servant	2.372	39	1.4988
		Private company employee	2.521	73	1.5974
		Student	1.741	27	1.4569
		Enterpreneur	2.083	12	1.5497
		Unemployed	1.7	5	1.9875
		Total	2.324	289	1.5434
Total			0	2	0
		Housewife	4	2	0.7071
		Civil servant	3	1	.
		Private company employee	1.75	2	2.4749
		Total	2.071	7	1.9881
	Bachelor	Housewife	2.375	60	1.4833
		Other	2.293	29	1.8103
		Civil servant	2.588	34	1.4589

Report of Knowledge Score					
Gender	Education	Occupation	Mean	N	Std. Deviation
		Private company employee	2.424	105	1.6346
		Student	2.423	13	2.1684
		Enterpreneur	2.583	18	1.5741
		Unemployed	2.571	7	2.2066
		Total	2.434	266	1.6248
	Master	Housewife	2.5	14	1.4412
		Other	2.967	15	1.3819
		Civil servant	2.761	23	1.6643
		Private company employee	2.952	31	1.7765
		Student	2.444	9	1.3097
		Enterpreneur	2.944	9	0.8457
		Unemployed	2.25	4	2.0616
		Total	2.781	105	1.5394
	Doctor	Other	5	1	.
		Civil servant	3.917	6	1.3571
		Private company employee	3	1	.
		Enterpreneur	4	1	.
		Total	3.944	9	1.1844
	Elementary school	Private company employee	3	1	.
		Total	3	1	.
	College	Housewife	2.25	14	1.205
		Other	4.5	1	.
		Civil servant	2.143	7	1.7008
		Private company employee	2.5	8	1.3628
		Student	1	2	1.4142
		Enterpreneur	0	2	0
		Total	2.147	34	1.454

Report of Knowledge Score					
Gender	Education	Occupation	Mean	N	Std. Deviation
	High School	Housewife	1.385	13	1.1209
		Civil servant	0	1	.
		Private company employee	2.2	5	1.4832
		Student	1.472	18	1.5192
		Enterpreneur	2	1	.
		Unemployed	0	1	.
		Total	1.474	39	1.3618
	Junior high school	Student	1.25	2	1.7678
		Total	1.25	2	1.7678
	Total		0	2	0
		Housewife	2.282	103	1.4309
		Other	2.62	46	1.7165
		Civil servant	2.681	72	1.5774
		Private company employee	2.526	153	1.6412
		Student	1.92	44	1.715
		Enterpreneur	2.548	31	1.4683
		Unemployed	2.25	12	2.0835
		Total	2.431	463	1.6118

Appendix 1a – Water Literacy Score

Comparison of water literacy score (WLS) between different group (gender, education and occupation) presented in the table below. The table was made using crosstabulation feature in SPSS, however, there was no relationship test applied for the variables presented in the table (for example chi square test of independence). The purpose of presenting the table is to provide information for descriptive analysis. Awareness score (AW) and water related behaviour score (WRB) also presented in the table.

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
Men	N/A	N/A	Mean	.0000	25.0000	12.5000
			N	1	1	1
			Std. Deviation	.	.	.
		Civil servant	Mean	78.2609	23.0769	43.6037
			N	1	1	1
			Std. Deviation	.	.	.
		Private employee	Mean	31.2500	28.5714	36.6815
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	36.5036	25.5495	30.9284
			N	3	3	3
			Std. Deviation	39.39405	2.78816	16.33045
	Bachelor	Other	Mean	47.3116	35.1391	37.4704
			N	8	8	8
			Std. Deviation	16.84252	7.14155	8.78033
		Civil servant	Mean	41.9366	37.2068	40.2618

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			N	11	11	11
			Std. Deviation	19.48955	16.75936	15.48563
		Private company employee	Mean	50.4156	36.0179	40.8102
			N	57	57	57
			Std. Deviation	17.96913	17.50643	15.06118
		Student	Mean	43.6499	36.5944	44.6263
			N	5	5	5
			Std. Deviation	16.63134	9.32543	14.79673
		Entrepreneur	Mean	49.8413	37.5514	42.2777
			N	10	10	10
			Std. Deviation	18.25268	8.34506	12.40110
		Unemployed	Mean	37.2115	49.4444	48.6084
			N	3	3	3
			Std. Deviation	20.57490	9.17928	14.98876
		Total	Mean	48.3168	36.7045	41.0698
			N	94	94	94
			Std. Deviation	17.96846	15.38569	14.18498
	Master	Other	Mean	59.7796	39.1162	45.6141
			N	6	6	6
			Std. Deviation	8.75695	16.09128	11.16704
		Civil servant	Mean	46.8063	40.3371	44.8509
			N	13	13	13

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	12.31179	15.05677	12.19680
		Private company employee	Mean	56.4355	32.1292	42.8037
			N	16	16	16
			Std. Deviation	18.79670	12.59791	11.62489
		Student	Mean	56.0417	33.5227	43.7926
			N	4	4	4
			Std. Deviation	14.89741	17.65195	14.60107
		Entrepreneur	Mean	52.9437	41.0256	46.5464
			N	7	7	7
			Std. Deviation	7.87360	8.78151	5.73020
		Unemployed	Mean	43.8552	39.4444	41.7971
			N	3	3	3
			Std. Deviation	15.34043	18.28276	5.59474
		Total	Mean	52.9891	36.9949	44.2447
			N	49	49	49
			Std. Deviation	14.62145	13.83886	10.64585
	Doctor	Other	Mean	50.0000	63.6364	65.1515
			N	1	1	1
			Std. Deviation	.	.	.
		Civil servant	Mean	57.3898	45.4060	53.3699
			N	6	6	6
			Std. Deviation	11.60855	11.03173	4.51621

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
		Entrepreneur	Mean	53.8462	45.4545	52.8555
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	56.0231	47.6909	54.7783
			N	8	8	8
			Std. Deviation	10.18414	11.33313	5.67177
	College	Other	Mean	54.1667	46.1538	55.3686
			N	1	1	1
			Std. Deviation	.	.	.
		Civil servant	Mean	38.6029	33.3333	34.6507
			N	2	2	2
			Std. Deviation	36.91513	11.78511	26.90645
		Private employee	Mean	45.2991	38.1818	37.7074
			N	2	2	2
			Std. Deviation	1.20873	2.57130	8.72414
		Student	Mean	62.5000	30.0000	38.9583
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	47.4118	36.5307	39.8405
			N	6	6	6
			Std. Deviation	18.98204	7.83140	14.86564
	High school	Housewife	Mean	41.6667	27.2727	24.0530
			N	1	1	1

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	.	.	.
		Private employee	Mean	40.1348	32.0265	33.8595
			N	4	4	4
			Std. Deviation	30.33701	4.41105	12.61304
		Student	Mean	27.3504	29.6830	24.8041
			N	6	6	6
			Std. Deviation	7.18986	10.75630	5.97647
		Entrepreneur	Mean	36.8421	36.3636	35.7257
			N	1	1	1
			Std. Deviation	.	.	.
		Unemployed	Mean	10.0000	25.0000	15.0000
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	31.7808	30.3724	27.6186
			N	13	13	13
			Std. Deviation	18.28968	7.77294	9.56053
	Junior high school	Student	Mean	26.3158	45.4545	29.3062
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	26.3158	45.4545	29.3062
			N	1	1	1
			Std. Deviation	.	.	.

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
	Total		Mean	.0000	25.0000	12.5000
			N	1	1	1
			Std. Deviation	.	.	.
		Housewife	Mean	41.6667	27.2727	24.0530
			N	1	1	1
			Std. Deviation	.	.	.
		Other	Mean	52.5836	39.1000	43.3730
			N	16	16	16
			Std. Deviation	13.93159	12.72519	11.80461
		Civil servant	Mean	47.5633	39.2678	44.2141
			N	33	33	33
			Std. Deviation	17.40321	14.68083	13.54678
		Private company employee	Mean	50.7380	35.0016	40.7322
			N	80	80	80
			Std. Deviation	18.67713	15.86974	14.04157
		Student	Mean	40.9020	33.5656	36.1995
			N	17	17	17
			Std. Deviation	17.25972	11.59607	13.95052
		Entrepreneur	Mean	50.5109	39.1849	44.0623
			N	19	19	19
			Std. Deviation	14.17015	8.12102	10.00821
		Unemployed	Mean	36.1715	41.6667	40.8881
			N	7	7	7

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	19.07276	14.78237	15.07432
		Total	Mean	48.3901	36.6703	41.3043
			N	174	174	174
			Std. Deviation	17.98200	14.24288	13.58109
Women			Mean	.0000	12.5000	6.2500
			N	1	1	1
			Std. Deviation	.	.	.
		Housewife	Mean	43.3424	19.5513	37.2779
			N	2	2	2
			Std. Deviation	18.25412	15.86458	15.44209
		Private company employee	Mean	52.6316	41.6667	33.9912
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	34.8291	23.3173	28.6993
			N	4	4	4
			Std. Deviation	25.87250	15.63931	17.48922
	Bachelor	Housewife	Mean	43.0043	40.6413	40.9676
			N	60	60	60
			Std. Deviation	13.88135	12.03390	11.13698
		Other	Mean	48.7387	40.2459	42.4266
			N	21	21	21
			Std. Deviation	15.86554	12.64970	13.56081

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
		Civil servant	Mean	47.1690	35.9795	40.3798
			N	23	23	23
			Std. Deviation	14.31551	12.94687	11.00720
		Private company employee	Mean	37.6082	39.5231	39.1462
			N	48	48	48
			Std. Deviation	16.40129	12.88927	12.96964
		Student	Mean	40.0925	37.7768	35.6824
			N	8	8	8
			Std. Deviation	19.82124	20.10314	18.99166
		Entrepreneur	Mean	54.9024	39.9359	44.1102
			N	8	8	8
			Std. Deviation	10.37013	9.53190	11.07972
		Unemployed	Mean	31.4850	39.1924	35.2799
			N	4	4	4
			Std. Deviation	23.05705	3.60482	14.04475
		Total	Mean	42.9055	39.4579	40.3269
			N	172	172	172
			Std. Deviation	15.83341	12.59920	12.35827
	Master	Housewife	Mean	57.6260	32.2586	40.9525
			N	14	14	14
			Std. Deviation	18.80176	15.30237	14.81949
		Other	Mean	54.6554	34.3732	44.0449
			N	9	9	9

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	16.66159	19.88580	16.93161
		Civil servant	Mean	49.7905	39.9895	42.0257
			N	10	10	10
			Std. Deviation	15.45854	10.37886	10.86118
		Private company employee	Mean	49.6079	39.8757	44.2842
			N	15	15	15
			Std. Deviation	13.70805	14.24627	15.94779
		Student	Mean	36.2872	41.4918	37.7344
			N	5	5	5
			Std. Deviation	17.67876	6.16505	9.59037
		Entrepreneur	Mean	34.2437	30.0000	33.9776
			N	2	2	2
			Std. Deviation	18.12333	.00000	1.58455
		Unemployed	Mean	61.9048	8.3333	23.8095
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	50.9378	36.3357	41.6910
			N	56	56	56
			Std. Deviation	16.90492	14.62052	14.02447
	Doctor	Private company employee	Mean	71.4286	58.3333	59.5238
			N	1	1	1
			Std. Deviation	.	.	.

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
		Total	Mean	71.4286	58.3333	59.5238
			N	1	1	1
			Std. Deviation	.	.	.
	Elementary school	Private company employee	Mean	30.4348	41.6667	40.9420
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	30.4348	41.6667	40.9420
			N	1	1	1
			Std. Deviation	.	.	.
	College	Housewife	Mean	45.0183	37.1174	39.1883
			N	14	14	14
			Std. Deviation	12.20270	10.42066	9.86745
		Civil servant	Mean	35.6071	41.7576	38.9472
			N	5	5	5
			Std. Deviation	13.20989	14.31662	9.97190
		Private company employee	Mean	42.2082	44.1200	44.0704
			N	6	6	6
			Std. Deviation	8.17666	19.43133	13.19028
		Student	Mean	38.8889	40.0000	29.7222
			N	1	1	1
			Std. Deviation	.	.	.
		Entrepreneur	Mean	43.3036	33.8384	27.7451
			N	2	2	2

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	.63135	16.42773	8.37170
		Total	Mean	42.3942	39.3153	39.0360
			N	28	28	28
			Std. Deviation	11.07106	13.17365	10.71115
	High school	Housewife	Mean	39.6735	31.4758	31.9063
			N	12	12	12
			Std. Deviation	11.86030	15.15987	10.78312
		Civil servant	Mean	33.3333	20.0000	18.3333
			N	1	1	1
			Std. Deviation	.	.	.
		Private company employee	Mean	38.4615	36.3636	42.3805
			N	1	1	1
			Std. Deviation	.	.	.
		Student	Mean	36.4401	34.3619	33.9299
			N	12	12	12
			Std. Deviation	20.30391	13.89496	14.44556
		Total	Mean	37.8907	32.5545	32.7211
			N	26	26	26
			Std. Deviation	15.70548	13.96724	12.49042
	Junior high school	Student	Mean	45.0000	30.7692	37.0513
			N	1	1	1
			Std. Deviation	.	.	.

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
		Total	Mean	45.0000	30.7692	37.0513
			N	1	1	1
			Std. Deviation	.	.	.
	Total		Mean	.0000	12.5000	6.2500
			N	1	1	1
			Std. Deviation	.	.	.
		Housewife	Mean	44.9024	37.5152	39.5829
			N	102	102	102
			Std. Deviation	14.95754	13.28965	11.69643
		Other	Mean	50.5137	38.4841	42.9121
			N	30	30	30
			Std. Deviation	16.05564	15.06438	14.36932
		Civil servant	Mean	46.0041	37.3388	40.0529
			N	39	39	39
			Std. Deviation	14.71918	12.55309	11.05508
		Private company employee	Mean	41.0345	40.2465	40.8842
			N	73	73	73
			Std. Deviation	16.01202	13.43760	13.49537
		Student	Mean	37.9017	36.7698	35.1134
			N	27	27	27
			Std. Deviation	18.25406	14.33174	14.24331
		Entrepreneur	Mean	49.5261	37.2637	39.6939
			N	12	12	12

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	12.99444	9.96350	11.43698
		Unemployed	Mean	37.5689	33.0206	32.9859
			N	5	5	5
			Std. Deviation	24.16182	14.14929	13.20058
		Total	Mean	43.9122	38.0375	39.6782
			N	289	289	289
			Std. Deviation	16.16823	13.42146	12.81591
Total			Mean	.0000	18.7500	9.3750
			N	2	2	2
			Std. Deviation	.00000	8.83883	4.41942
		Housewife	Mean	43.3424	19.5513	37.2779
			N	2	2	2
			Std. Deviation	18.25412	15.86458	15.44209
		Civil servant	Mean	78.2609	23.0769	43.6037
			N	1	1	1
			Std. Deviation	.	.	.
		Private company employee	Mean	41.9408	35.1190	35.3364
			N	2	2	2
			Std. Deviation	15.11906	9.25973	1.90234
		Total	Mean	35.5467	24.2739	29.6546
			N	7	7	7
			Std. Deviation	29.20259	11.23872	15.59650

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
	Bachelor	Housewife	Mean	43.0043	40.6413	40.9676
			N	60	60	60
			Std. Deviation	13.88135	12.03390	11.13698
		Other	Mean	48.3450	38.8371	41.0594
			N	29	29	29
			Std. Deviation	15.84726	11.50836	12.47838
		Civil servant	Mean	45.4762	36.3766	40.3416
			N	34	34	34
			Std. Deviation	16.05925	14.04284	12.38723
		Private company employee	Mean	44.5608	37.6203	40.0495
			N	105	105	105
			Std. Deviation	18.34473	15.59432	14.10165
		Student	Mean	41.4607	37.3220	39.1224
			N	13	13	13
			Std. Deviation	18.01738	16.28166	17.43247
		Entrepreneur	Mean	52.0907	38.6112	43.0922
			N	18	18	18
			Std. Deviation	15.07835	8.70440	11.52576
		Unemployed	Mean	33.9392	43.5861	40.9922
			N	7	7	7
			Std. Deviation	20.40324	8.03826	14.97571
		Total	Mean	44.8178	38.4849	40.5894
			N	266	266	266

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	16.78673	13.68379	13.01127
	Master	Housewife	Mean	57.6260	32.2586	40.9525
			N	14	14	14
			Std. Deviation	18.80176	15.30237	14.81949
		Other	Mean	56.7051	36.2704	44.6726
			N	15	15	15
			Std. Deviation	13.88425	18.00633	14.45637
		Civil servant	Mean	48.1038	40.1860	43.6226
			N	23	23	23
			Std. Deviation	13.51766	12.95209	11.46525
		Private company employee	Mean	53.1318	35.8775	43.5201
			N	31	31	31
			Std. Deviation	16.62467	13.76780	13.66832
		Student	Mean	45.0670	37.9500	40.4269
			N	9	9	9
			Std. Deviation	18.65190	12.38917	11.66745
		Entrepreneur	Mean	48.7881	38.5755	43.7533
			N	9	9	9
			Std. Deviation	12.47186	9.02628	7.46039
		Unemployed	Mean	48.3676	31.6667	37.3002
			N	4	4	4
			Std. Deviation	15.43802	21.55956	10.08742

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
		Total	Mean	51.8950	36.6434	42.8827
			N	105	105	105
			Std. Deviation	15.83856	14.19670	12.56835
	Doctor	Other	Mean	50.0000	63.6364	65.1515
			N	1	1	1
			Std. Deviation	.	.	.
		Civil servant	Mean	57.3898	45.4060	53.3699
			N	6	6	6
			Std. Deviation	11.60855	11.03173	4.51621
		Private company employee	Mean	71.4286	58.3333	59.5238
			N	1	1	1
			Std. Deviation	.	.	.
		Entrepreneur	Mean	53.8462	45.4545	52.8555
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	57.7349	48.8733	55.3056
			N	9	9	9
			Std. Deviation	10.82228	11.17898	5.53625
	Elementary school	Private company employee	Mean	30.4348	41.6667	40.9420
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	30.4348	41.6667	40.9420
			N	1	1	1

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	.	.	.
	College	Housewife	Mean	45.0183	37.1174	39.1883
			N	14	14	14
			Std. Deviation	12.20270	10.42066	9.86745
		Other	Mean	54.1667	46.1538	55.3686
			N	1	1	1
			Std. Deviation	.	.	.
		Civil servant	Mean	36.4631	39.3506	37.7197
			N	7	7	7
			Std. Deviation	18.59011	13.29244	13.83283
		Private company employee	Mean	42.9809	42.6355	42.4796
			N	8	8	8
			Std. Deviation	7.07188	16.67928	11.99262
		Student	Mean	50.6944	35.0000	34.3403
			N	2	2	2
			Std. Deviation	16.69558	7.07107	6.53092
		Entrepreneur	Mean	43.3036	33.8384	27.7451
			N	2	2	2
			Std. Deviation	.63135	16.42773	8.37170
		Total	Mean	43.2797	38.8239	39.1779
			N	34	34	34
			Std. Deviation	12.59549	12.34686	11.28932

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
	High school	Housewife	Mean	39.8269	31.1525	31.3022
			N	13	13	13
			Std. Deviation	11.36882	14.56121	10.55131
		Civil servant	Mean	33.3333	20.0000	18.3333
			N	1	1	1
			Std. Deviation	.	.	.
		Private company employee	Mean	39.8002	32.8939	35.5637
			N	5	5	5
			Std. Deviation	26.28328	4.28429	11.56885
		Student	Mean	33.4102	32.8023	30.8880
			N	18	18	18
			Std. Deviation	17.36070	12.81044	12.85009
		Entrepreneur	Mean	36.8421	36.3636	35.7257
			N	1	1	1
			Std. Deviation	.	.	.
		Unemployed	Mean	10.0000	25.0000	15.0000
			N	1	1	1
			Std. Deviation	.	.	.
		Total	Mean	35.8541	31.8271	31.0202
			N	39	39	39
			Std. Deviation	16.62611	12.18647	11.72351
	Junior high school	Student	Mean	35.6579	38.1119	33.1788
			N	2	2	2

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
			Std. Deviation	13.21173	10.38409	5.47659
		Total	Mean	35.6579	38.1119	33.1788
			N	2	2	2
			Std. Deviation	13.21173	10.38409	5.47659
	Total		Mean	.0000	18.7500	9.3750
			N	2	2	2
			Std. Deviation	.00000	8.83883	4.41942
		Housewife	Mean	44.8710	37.4158	39.4321
			N	103	103	103
			Std. Deviation	14.88745	13.26280	11.73912
		Other	Mean	51.2336	38.6983	43.0724
			N	46	46	46
			Std. Deviation	15.22554	14.15317	13.40008
		Civil servant	Mean	46.7188	38.2229	41.9601
			N	72	72	72
			Std. Deviation	15.90828	13.50608	12.34833
		Private company employee	Mean	46.1082	37.5041	40.8047
			N	153	153	153
			Std. Deviation	18.06635	14.94442	13.73863
		Student	Mean	39.0609	35.5318	35.5331
			N	44	44	44
			Std. Deviation	17.73431	13.29362	13.97743

Report of Water Literacy Score						
Gender	Education	Occupation		AW_score	WRB_score	WLS
		Entrepreneur	Mean	50.1297	38.4412	42.3713
			N	31	31	31
			Std. Deviation	13.51397	8.76784	10.61784
		Unemployed	Mean	36.7537	38.0641	37.5955
			N	12	12	12
			Std. Deviation	20.27872	14.55384	14.27829
		Total	Mean	45.5951	37.5237	40.2893
			N	463	463	463
			Std. Deviation	16.99276	13.73661	13.11782

Appendix 2 – List of Products' Brand

Below is the list of brands for products containing scrub which used by the respondents. The list was used to analysed potential of water pollution from primary micro plastic or plastic microbeads. Information of brands with micro plastic derived from beatthemicrobead.com

No	Product brand with scrub	Users	No	Product brand with scrub	Users
1	Ayudia lulur	1	23	Mustika Ratu	1
2	Biore	17	24	Nature	1
3	Clean & Clear	3	25	Nature Organic	1
4	Clear men	1	26	Nivea	7
5	Close-up	1	27	Nu Skin	4
6	Enzim	1	28	Nuriskin	1
7	Erha	1	29	Oriflame	1
8	Garnier	4	30	Ovale	1
9	Gatsby	5	31	Pepsodent	4
10	Hadalabo	1	32	Pixy	1
11	Heborist	1	33	Ponds	12
12	Herbal	1	34	Purbasari	3
13	Himalaya	3	35	Sari Ayu	6
14	Innisfree	1	36	SK-II	1
15	Jafra	3	37	Skinfood	1
16	Jasper	1	38	Sunsilk	1
17	Kanebo	1	39	The Body Shop	3
18	Klinsen	1	40	Tish scrub	1
19	Lifebuoy	3	41	Unilever	1
20	London Beauty Centre	1	42	Victory	1
21	L'oreal	1	43	Vienna	1
22	Lulur Bali	2	44	Wardah	9
				Total	116 users

Appendix 3 – Survey's Questions

The table below presents a recapitulation for question used in the survey. Original language used in the survey is 'Bahasa'. This table include all the questions recorded by *typeform.com*, therefore, there are several questions repeated due to 'logic jump' feature.

No.	ID	Questions in English
1		What is your gender?
2		What is your age?
3		Type/Choose your Province
4		Please write your city/regency name
5		Marital status
6		Do you have children?
7		Child number
8	AW1	Have you ever informed your children about the importance of "saving water"?
9	AW2	Have you ever show your children how to save water?
10		What is the highest level of education you have completed?
11		other' category of education
12		What is your occupation?
13		Average monthly income
14		Did your parents informed you about the importance of saving water?
15		Did your parents give examples on how to save water?
16		FOE: limited water to support activities (hygiene activities)
17		FOE: limited water for consumption activities (drinking, cooking)
18		FOE: Flood
19		FOE: No water to support activities
20		FOE: No water for consumption activities
21		FOE: Drought
22		FOE- indirect: Flood
23		FOE- indirect: polluted waterway by solid waste
24		FOE- indirect: polluted waterway by industrial activities
25		FOE- indirect: polluted waterway by sewage
26		FOE- indirect: polluted waterway, indicated by dead fish

No.	ID	Questions in English
27		FOE-indirect: polluted waterway, indicated by change in color
28		FOE-indirect: limited availability of water
29		Do you own car/motor vehicle?
30		Do you wash your car/motor vehicle at home?
31	AW3	Have you ever applied 'water efficient' technique when washing your vehicle?
32		Housing status
33		How many people, including yourself, live in your household?
34		is there any leak in your pipe or tap?
35		What is the main source of clean water in your house? (for personal hygiene)
36		Do you have water storage tank in your house?
37	AW4	Do you know the capacity of water storage tank?
38		What is the capacity of the water storage?
39		Do you have garden in your house?
40	AW5	When do you usually watering your garden/lawn?
41	WRB1	How often do you watering your garden/lawn?
42		Do you have plants inside your house?
43	AW6	When do you usually watering your indoor plants?
44	WRB2	How often do you watering your indoor plants?
45		Do you have fish pond in your house?
46	AW7	Do you know the capacity/volume of your fish pond?
47		please write the capacity/volume of your fish pond
48		How often do you change the water in the fish pond?
49		Do you have swimming pool in your house?
50	AW8	Do you know the capacity/volume of your Swimming pool?
51		please write the capacity/volume of your swimming pool
52		How often do you change the water in the swimming pool?
53	AW9	What is your main source for drinking water in your house (water for cooking & drinking)?
54	AW10	Choose the one with similar wastewater pipe arrangement in your house
55		Does your neighborhood have garbage collection facility
56	AW11	Do you know how much water consumed in your household every month?
57		Please write your monthly average water consumption (in m3 or liter)

No.	ID	Questions in English
58	AW12	Do you know how much your water bill cost (monthly average)?
59		Please write your monthly average water bill
60		Do you have water storage tank in your house?
61	AW4	Do you know the capacity of water storage tank?
62		What is the capacity of the water storage tank?
63		Do you have garden in your house?
64	AW5	When do you usually watering your garden/lawn?
65	WRB1	How often do you watering your garden/lawn?
66		Do you have plants inside your house?
67	AW6	When do you usually watering your indoor plants?
68	WRB2	How often do you watering your indoor plants?
69		Do you have fish pond in your house?
70	AW7	Do you know the capacity/volume of your fish pond?
71		please write the capacity/volume of your fish pond
72		How often do you change the water in the fish pond?
73		Do you have swimming pool in your house?
74	AW8	Do you know the capacity/volume of your Swimming pool?
75		please write the capacity/volume of your swimming pool
76		How often do you change the water in the swimming pool?
77	AW9	What is your main source for drinking water in your house (water for cooking & drinking)?
78	AW10	Choose the one with similar wastewater pipe arrangement in your house
79		Does your neighborhood have garbage collection facility
80		Do you use electric pump to take water from the groundwater well?
81	AW13	Is the pump works automatically (automatic on/off)?
82	AW14	Have you ever forgot to turn off the pump and caused water waste?
83	AW15	is there any permeable area in your house?
84		Do you have water storage tank in your house?
85	AW4	Do you know the capacity of water storage tank?
86		What is the capacity of the water storage?
87		Do you have garden in your house?
88	AW16	Do you plant trees in your garden?

No.	ID	Questions in English
89	AW5	When do you usually watering your garden/lawn?
90	WRB1	How often do you watering your garden/lawn?
91		Do you have plants inside your house?
92	AW6	When do you usually watering your indoor plants?
93	WRB2	How often do you watering your indoor plants?
94		Do you have fish pond in your house?
95	AW7	Do you know the capacity/volume of your fish pond?
96		please write the capacity/volume of your fish pond
97		How often do you change the water in the fish pond?
98		Do you have swimming pool in your house?
99	AW8	Do you know the capacity/volume of your Swimming pool?
100		please write the capacity/volume of your swimming pool
101		How often do you change the water in the swimming pool?
102		Other
103	AW9	What is your main source for drinking water in your house (water for cooking & drinking)?
104	AW10	Choose the one with similar wastewater pipe arrangement in your house
105		Does your neighborhood have garbage collection facility
106	AW17	Do you know the final disposal location of your household garbage?
107		Please fill in the location of your disposal location
108	AW18	Do you sort your garbage/trash?
109		Please explain briefly on how you sort the garbage
110	AW18	Do you sort your garbage/trash?
111		Please explain briefly on how you sort the garbage
112		Where do you dispose your solid waste?
113		Please fill in the location of your disposal location
114		How do you dispose your solid waste?
115		In the last week, have you ever forgot to turn of the tap after using hose?
116		In the last week, have you ever let the water wasted when you fill up the storage tank/ water bucket?
117		Please fill in the reason of wasting the water
118		How often do you take a bath in a day?

No.	ID	Questions in English
119	WRB3	I take a bath using…
120		please fill in the device that you use for taking a bath
121		water bailer user: water storage in my bathroom
122	WRB4	bucket user: water that I used every time I take a bath
123	WRB5	120 L water tank: water that I used every time I take a bath
124	WRB6	bath tub user: water that I used every time I take a bath
125		
126	WRB7	shower user: total showering time
127	WRB8	shower user: shower mode that I use
128		toilet type
129		flush type
130		squat toilet user: water that I used to flush the toilet
131	WRB9	I usually brush my teeth like this
132	WRB10	I usually wash my hands like this
133	WRB11	I usually wash the dishes like this
134	WRB12	When I have leftover in my plate, I will...
135		I wash my clothes using
136	AW19	Washing machine types (is there any ‘water saving’ feature in your washing machine?)
137	AW20	Do you always activate the 'water saving mode' in your washing machine?
138	AW21	Do you always do the laundry with full load capacity?
139		Please fill in the frequency to do the laundry in a week
140	WRB13	Method that I use to rinse the clothes
141		Please fill in the frequency to do the laundry in a week
142		Do you cook at home?
143		What is the water source for cooking in your home?
144		How many gallons per week do you buy for cooking purpose?
145		Do you use cooking oil?
146	AW22	Where do you usually dispose your used cooking oil?
147		Have you ever consumed medicine?
148	AW23	What did you do with expired medicine?
149	AW24	Have you ever throw expired medicine to the toilet?

No.	ID	Questions in English
150		How many products that you used in the bathroom? (product that washed away with water)
151		Do you use personal care product which contains microbeads?
152		Please fill in the brand of your 'scrub' containing product
153	AW25	Main consideration/ main reason to choose the personal care product
154	AW26	Main consideration/ main reason to choose the home care / cleaner product
155	WRB14	Do you always drink all the water that you take by yourself?
156	WRB15	Do you always drink all the water that people serve to you?
157	WRB16	Do you always finish up the food that you take by yourself?
158	WRB17	Do you always finish up the food that served for you?
159		How much water is on earth, that available for human consumption? (percentage of fresh water)
160		Most of the fresh water stored in
161		Do you think that the water volume on earth will changes trough time? (right/wrong)
162		Household/domestic activity does not contribute to water pollution (choose your opinion: Agree - Disagree)
163		Water conservation activities at home will give significant impact for the environment (choose your opinion: Agree - Disagree)
164		Citizen/public could contribute in water pollution prevention (choose your opinion: Agree - Disagree)
165	AW27	Do you know/Have you heard about "Water footprint" concept?
166		Are you interested to know more about "water footprint concept?
167	AW28	Do you know/Have you heard about "micro plastic" issue?
168		Are you interested to know more about "micro plastic"?

Appendix 4 – Gender, Occupation and Educational Background

Tables below provide information regarding number of men and women with different occupation and educational background.

Occupation	Men	Women	Total
No Answer	1	1	2
Housewife	1	102	103
Other	16	30	46
Civil servant	33	39	72
Private employee	80	73	153
Student	17	27	44
Entrepreneur	19	12	31
Unemployed	7	5	12
Total	174	289	463

Educational Background	Men	Women	Total
No Answer	3	4	7
Bachelor	94	172	266
Master	49	56	105
Doctor	8	1	9
Elementary school	0	1	1
College	6	28	34
High school	13	26	39
Junior high school	1	1	2
Total	174	289	463