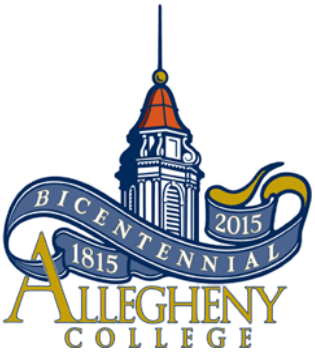
Policy Analysis of the Water, Sanitation & Hygiene (WASH) Systems in Indonesia



Senior Comprehensive Project

in partial fulfillment of

Bachelor of Science Degree

Global Health Studies & Environmental Science & Sustainability

April 2023

Tiaralei Cade

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April 2023

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Tiaralei Cade

This work represents my own work unless otherwise cited.

This senior comprehensive project has met the minimum requirements of the Global Health Studies & Environmental Science & Sustainability majors for a Bachelors of Science degree

_____	_____
Professor Waggett	Professor Choate
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02/16/2023	02/16/2023

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ABSTRACT

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Indonesia is the largest island nation in the world and in the last two decades, there have been many efforts by the government and various NGOs to alleviate the issue of unsafe sanitation and hygiene. Despite governmental interventions, many regions both urban and rural still lack access to clean water. Safe sanitation and hygiene programs are fundamental as they affect not only the health of a population, but also help to reduce poverty levels, increase food security, ecosystems, and education levels. It is critical to look at the progress and effectiveness of interventions that have been made in regards to sanitation in order to provide recommendations for how to proceed in the future. Not all policies have the same levels of success in different countries and even different regions in a particular nation.

Indonesia is an interesting case study because of its unique geographical features which have resulted in a heavily decentralised government and distinct cultural beliefs and traditions. In recent years, the country has focused on educational campaigns, sanitation programs, and microfinance programs to improve its sanitation systems. In this policy analysis, the effectiveness of the various strategies that the Indonesian government has implemented have been analysed, and it was found that a combination of all three programs would be recommended to maximise effectiveness. This paper utilises a four-step rational policy analysis model, in which the policies are first identified and the criteria are established. Based on the criteria (cost, time, equity, and effectiveness), an assessment was completed which found that the STBM and microfinance programmes were ranked as the best overall policies with an overall score of 3.25/5, followed by the educational programme with an overall score of 2.75/5. Further analysis found that increased funds, as well as improved communication between different governmental levels, better enforcement policies, and increased training for sanitation and hygiene staff are the main recommendations moving forward in Indonesia's efforts to improve their WASH systems.

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Background of Water, Sanitation, and Hygiene in Indonesia

Chapter 1

Introduction

Indonesia, a country in Southeast Asia and Oceania between the Indian and Pacific Oceans, is the largest island nation in the world, with over 17,000 islands stretched across more than 3,000 miles from east to west. The country has more than 500 local governments, which all have varying levels of interaction and communication with the national government. Moreover, it is also the fourth-most populous country in the world, with 270 million people (Encyclopedia Britannica, n.d.). The population distribution varies dramatically across different islands and regions of the country (see Fig 1).

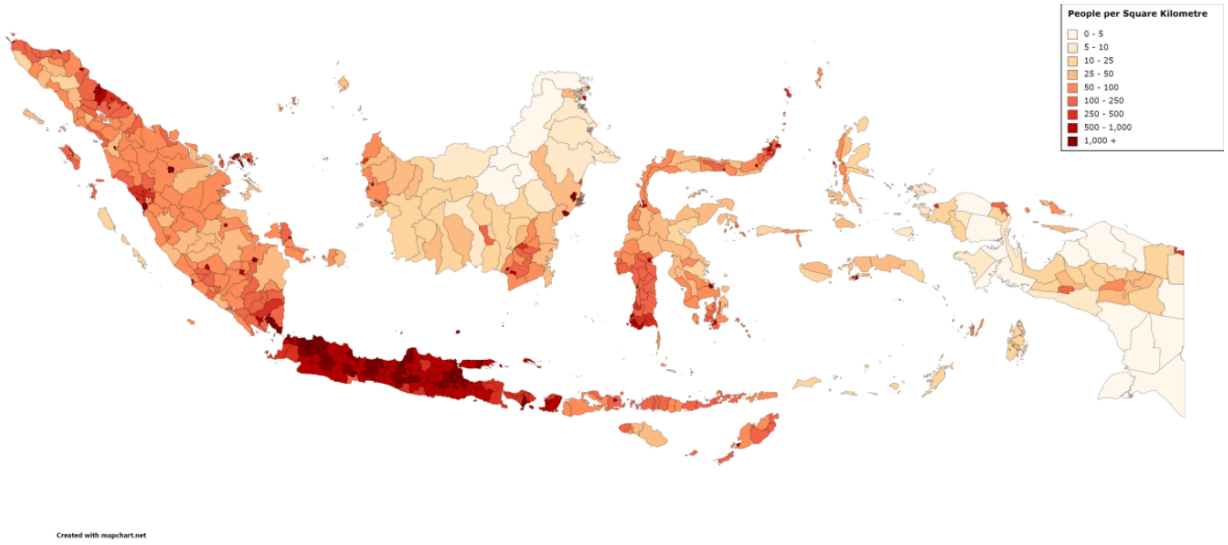


Fig 1: Indonesia population density map. (*Wondering Maps,* 2017)

Indonesia Water Resources

Indonesia has significant renewable water resources, but water supply and demand often do not align. The country has over 5,590 rivers, but most of these rivers contain high levels of sediment. This can have adverse effects on the surrounding environment, as sediment particles can absorb warmth from the sun and increase water temperature, which can decrease the biodiversity in rivers. In addition, it can increase the cost of treating drinking water and can result in odor and taste problems. In the worst cases, sediment may be contaminated with heavy metals, which can lead to impaired development and kidney damage in humans. Freshwater is abundant on Sumatra, Kalimantan, and Papua where population density is low ("Indonesia Water Resources Profile Overview," n.d.). Freshwater is less available on densely

populated islands like Java. Risks to urban water security in West Java are high, driven by low access rates to piped water and widespread pollution. Water stress is highest in Java, which contains more than half of the total population but only four percent of surface water supply. Irrigation and community water supplies are often insufficient during the dry season, and some cities such as Bandung are projected to have shortages in the near future, which can affect improved access to water and sanitation. According to the Falkenmark Index for water stress, some studies project that Java will experience absolute water scarcity by 2040 (Damkjaer & Taylor, 2017). In 2017, the country experienced a long-term average precipitation of 2,702 mm per year ("Indonesia Water Resources Profile Overview," n.d.). The annual precipitation varied considerably among different regions of the country (see Fig 2).

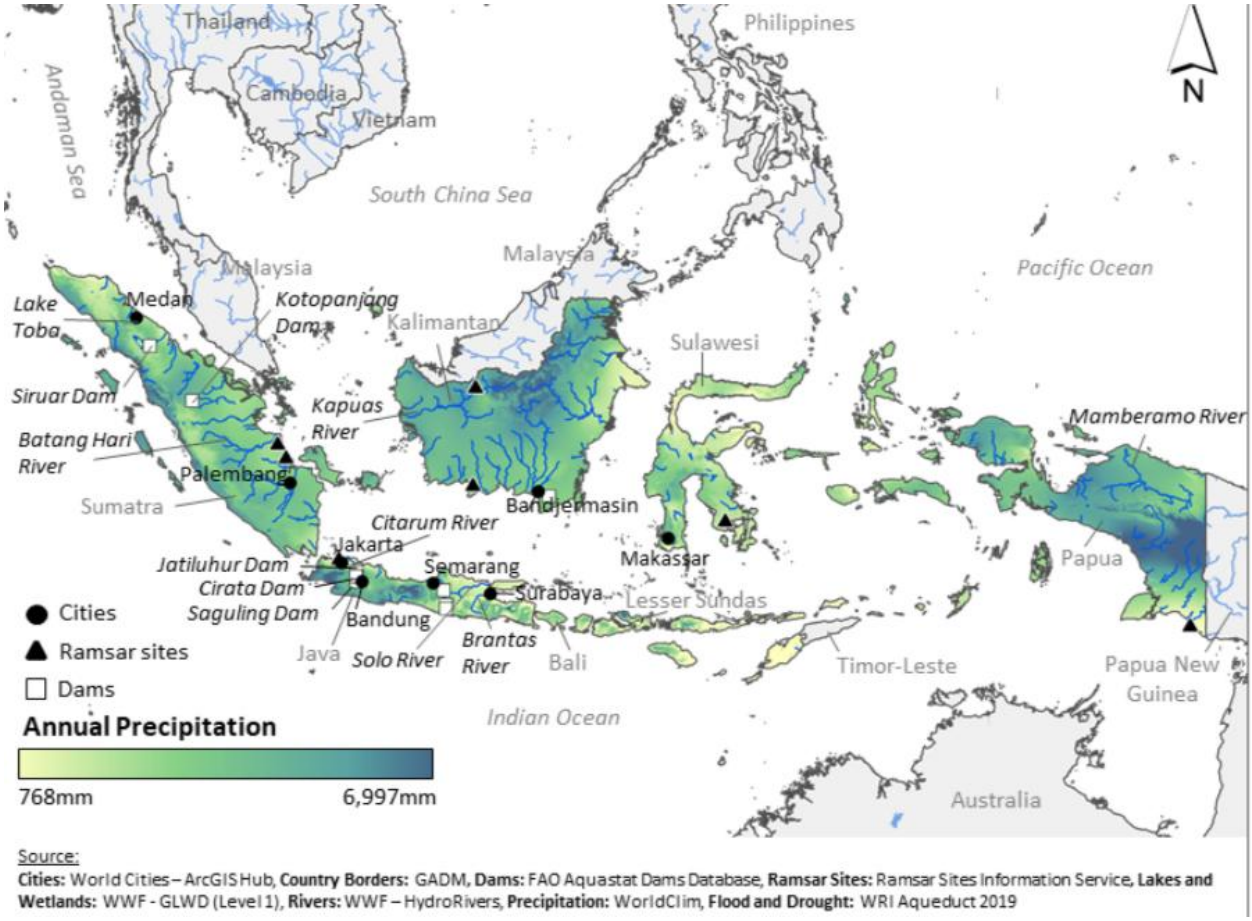


Fig 2: Map of Water Resources in Indonesia ("Indonesia Water Resources Profile Overview," n.d.)

Key Environmental Issues

Palm oil plantations and small-scale agriculture have increased erosion and sedimentation in reservoirs, decreased dry season river flows, and intensified the impacts of monsoon flooding.

Palm oil plantations are concentrated in Sumatra and Kalimantan, whose areas of small-scale agriculture are concentrated in Java and the eastern Lesser Sundas. It is also important to consider the impacts of climate change, which will increase drought frequency and severity, ultimately leading to severe dry season water shortages in water stressed areas ("Indonesia Water Resources Profile Overview," n.d.).

This topic has been outlined as one of the Sustainable Development Goals, a series of global goals set in 2015 and intended to be achieved by 2030. SDG 6 focuses on this issue, stating that there should be an "ensured access to water and sanitation for all ("Goal 6: Clean water and sanitation," n.d.)." In addition to safe access, the SDG also aims for the sustainable management of water resources, with a focus on the natural environment. It calls for an emphasis on strengthening the resilience of watersheds and investing in physical infrastructure in order to improve water access use and disaster preparedness. This focus will allow for the agriculture and food sectors in specific countries to be more resilient to rainfall variability and fulfill the needs of a growing population worldwide. Therefore, protecting and restoring water-related ecosystems and their biodiversity can ensure water purification and water quality standards (Bhaduri eat. al, 2016). In addition to improved water and sanitation hygiene, management of solid waste and wastewater, and pest and vector control will help to improve not only the health of humans but also the environment. For example, wastewater treatment requires proper drainage to be put into place in order to prevent water from stagnating around distribution points. Stagnated wastewater can be a breeding place for vectors like mosquitoes, which can help to facilitate the spread of insect-burned diseases (Daniel et. al, 2021). It is important to note that as a result of increased precipitation patterns and climate change differences, there is expected to be an increase in the population of mosquitoes in the country. Climate change can also increase mosquito-borne disease risk in less obvious ways. For example, when households store water in response to drought, this can increase local mosquito breeding sites and disease risk. Land use changes can also drive migration to cities, increasing the population at risk of explosive outbreaks of dengue and other mosquito-borne diseases ("Explainer: How Climate Change is Amplifying Mosquito-borne Diseases," n.d.).

Sanitation and Hygiene in Indonesia

Sanitation and hygiene is a significant issue in the country, despite relatively recent efforts to improve access to it. Access to safe water, sanitation, and hygiene is the most basic human need for health and well-being (Adams et. al, 2009). The water source for the country's inhabitants is more than just a matter of convenience; it can be the difference between life and death. Of the four main causes of death for children under 5 in Indonesia, two - diarrhea and typhoid - are fecal-borne illness linked to inadequate water supply and sanitation issues.

Water supply and sanitation in Indonesia is predominantly characterised by poor levels of access and quality. Only about two percent of people have access to sewerage in urban areas, which is one of the lowest in the world among middle-income countries. Most excreta and wastewater are discharged untreated or semi-treated into local drains or water bodies, which causes extensive environmental pollution. According to the World Bank, urban sanitation is the least well addressed of major policy issues in Indonesias. Women in Jakarta report spending $11 per month on boiling water implying a significant burden for the poor. The estimated level of public investment of only US $2 per capita a year in 2005 was insufficient to expand services significantly and to properly maintain assets.

Access to improved drinking water has increased from 37.73 percent in 1993 to 47.71 percent in 2015, with urban areas generally having more access to safe water sources (Bank, 2016). This relatively low number reflects the rate of development of drinking water infrastructure, which has not been able to match rapid population growth within the country. The provinces with the highest percentages of the population having access to drinking water sources are: DI Yogyakarta, Bali, and Sulawesi Tenggara. The provinces with the lowest proportion of households with access to improved drinking water sources are Banten, Aceh, and Bengkulu (Afifah et. al, 2018).

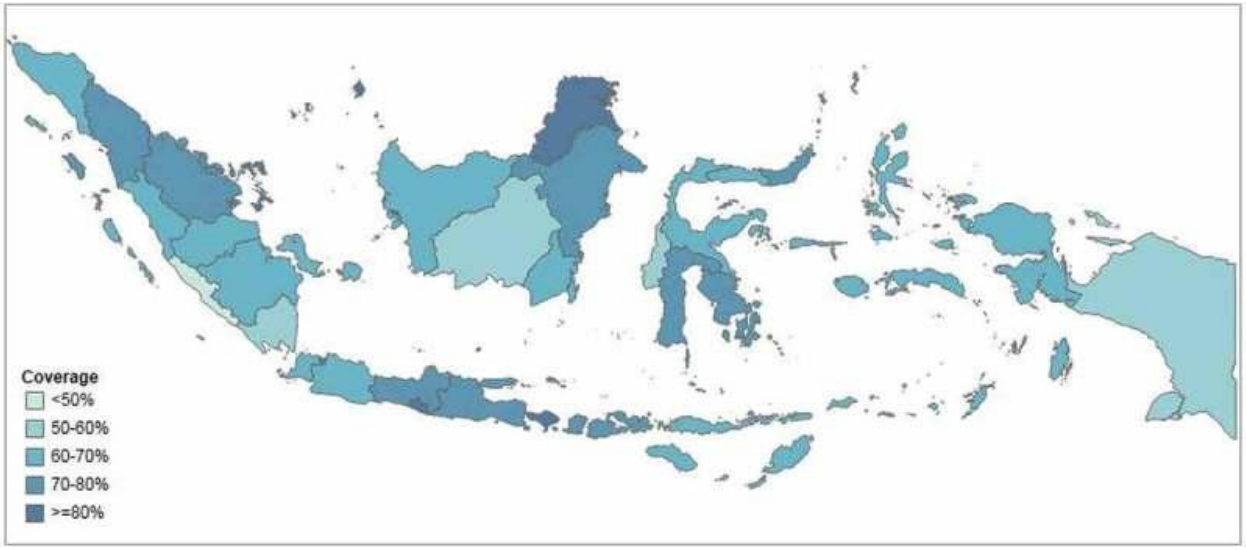


Fig 3: Map of Provinces in Indonesia w/ Improved Drinking Water Coverage (Afifah et. al, 2018)

Household access to basic sanitation facilities has increased in the last few decades, with less than a quarter of households having access to facilities in 1990 (24.81%) and more than half in 2015 (51.19%) (Bank, 2016). There is a wide gap in terms of sustainable access to basic sanitation among provinces and between urban and rural areas. The highest level of access to basic sanitation is 80.37 percent in DKI Jakarta while the lowest level, amounting to just 14.98

percent, is found in the province of Nusa Tenggara Timur. Nationally, it is estimated that 69.51 percent of urban populations have access to adequate sanitation facilities compared to only 33.96 percent in rural areas (Afifah et. al, 2018).



Fig 4: Map of Sanitation Coverage in Indonesia by Province (Afifah et. al, 2018)

Sanitation and Hygiene Globally

In 2020, 74 percent of the global population had access to safely managed drinking water services, up from 70 percent in 2015. Unfortunately, two billion people still lack access, and most of these individuals are concentrated in rural areas (eight out of every ten people), and half of them live in least developed countries (LDCs) ("Billions of people will lack access to safe water, sanitation, and hygiene in 2030 unless progress quadruples," n.d.). Globally, an estimated 673 million people still defecate in open spaces, and Indonesia ranks third in the world, with over 25 million people not using toilets. Rather, they defecate in fields, bushes, forests, ditches, streets, canals, or other open spaces ("'Transformational benefits' of ending outdoor defecation:Why toilets matter," n.d.). Moreover, only seven percent of wastewater is treated in the country. Among Indonesia's 34 provinces and 514 districts, just one province and 58 districts have achieved ODF (open-defecation free) status (Odigari et. al, 2020).

Global Context

This topic is important because while Indonesia is adversely affected by poor sanitary conditions and health, other regions around the world are also affected by this issue. One of the United Nations' Sustainable Development Goals is to "ensure availability and sustainable management of water and sanitation for all (Bartham et. al, 2005)." Despite this, Indonesia and many other countries have not met this goal to increase access to sanitation and clean water. Worldwide, one in three people do not have access to safe drinking water, and two out of five people do not have access to a basic hand-washing facility (Bartham et. al, 2005). It is critical to look at the

progress that has been made in regards to sanitation in order to provide recommendations for how to proceed in the future and analyze the effectiveness of interventions and policies that have already been incorporated in Indonesia. Not all policies have the same levels of success in different countries and even different regions in a particular nation. This is a result of cultural, political, geographical, and economic differences. Interventions which are most successful in Indonesia must skillfully balance the state and local communities and governments to clearly delineate their respective roles and responsibilities (Chambers, 2009).

The table below illustrates the impacts of improved water and sanitation interventions, discussed in more detail later in the chapter.

Benefits from Improved Water and Sanitation	Incidence of Benefit	
	Public	Private
Health Impacts (Direct and Indirect)		
Reduction in diarrhea and other diseases		√
Reduction in malnutrition and improved child development		√
Reduction in private health expenditure		√
Reduction in public health expenditure	√	
Reduction in days lost due to illness by patient and by caretaker		√
Savings in time and other coping efforts		
Reduction in time/energy spent collecting water, or in queues		√
Increase in income or leisure due to time savings		√
Reduction in expenditure on private water treatment		√
Reduction in expenditure on purchase of expensive water		√
Productive use of water		
Income from uses for cattle, poultry, and kitchen garden		√
Income from small industries		√
Gain in property values		
Increase in houses/shops, etc.		√
Increase in local revenues linked to property values	√	
Dignity, privacy, security, and social status		
Increased school attendance and retention in school for girls		√
Reduction in public expenditure on education	√	
Tenure security for informal low income settlements		√
Legal /regulatory framework for small water providers	√	√

Table 1. Illustrative Impacts of Improved Water and Sanitation Interventions (Mehta, 2008)

Health Effects

The fact that so few regions of the country have achieved ODF status is concerning from a public health standpoint, as human excrement is home to a plethora of pathogens, including those that have been linked to the transmission of diseases such as polio, cholera, dysentery, typhoid, and intestinal worm infections (Purnama & Susanna, 2020). Every year, there are 1.7 billion cases of diarrhea among children younger than 5 years. In 2018, an estimated 829,000 deaths were caused by diarrheal diseases related to unsafe hygiene and sanitation in Indonesia. An estimated 446,000 children worldwide die from diarrhea, which amounts to 9% of the 5.8 million deaths of children younger than 5 years old. There are 3 million cases of cholera and en estimated 95,000 cholera deaths. Additionally, there are 11 million cases of typhoid fever and an estimated 129,000 typhoid fever deaths ("Global Wash Fast Facts," 2022).

In addition, pathogens that live in feces are transmitted through water and soil to humans, which has been shown to cause infections that also lead to anemia, malnutrition, and impaired physical and cognitive development. Worldwide, hundreds of millions of people are infected by parasitic worms found in contaminated soil, many of which are associated with inadequate sanitation facilities. In addition, many hygiene and water-related neglected tropical diseases (NTDs) such as Guinean worm disease, trachoma, and schistosomiasis are all diseases that would be preventable if sanitation and hygiene facilities were of satisfactory quality ("Global Wash Fast Facts," 2022).

Eliminating open defecation in communities is crucial in reducing environmental fecal contamination and optimizing health and nutrition gains ("Transformational benefits' of ending outdoor defecation: Why toilets matter," n.d.). Lack of access to sanitation has been shown to increase the risks of children being stunted, having premature deaths, and obtaining less education (Cameron et. al, 2020). Recent evidence indicates a close relationship between stunting and poor WASH. A child's growth is hampered by constant exposure to the contamination resulting from poor WASH, and even a well-nourished child may become stunted without safe sanitation and hygiene systems. Poor WASH conditions can cause infectious disease, and consequently undernutrition due to poor appetite and mal-absorption which can result from these illnesses. Inadequate nutritional status can further increase susceptibility to infectious diseases, which can thereby create a vicious cycle of worsening illness and deteriorating nutritional status. There is a growing body of evidence that exposure to poor sanitation and hygiene creates environmental enteric dysfunction, a condition of the small intestine which is linked to stunting in children ("Nutrition - Wash Toolkit - UNICEF," n.d.).

This is a major contributor to diarrheal disease and preventable child deaths. In fact, poor sanitation and hygiene accounts for at least 600,000 deaths worldwide of children under 5 annually. In Indonesia, nearly one in 30 children die before reaching primary school, with figures

as high as one in 15 in the eastern part of the country. Eighty-five percent of these deaths are related to inadequate access to safe water and sanitation. For children, low WASH coverage is associated with a range of adverse health outcomes including intestinal parasitosis, stunting, and maternal deaths (Purnama & Susanna, 2020).

Moreover, the consequences of poor WASH for maternal and newborn health can be devastating. Exposure to dirty, stagnant water during pregnancy may lead to malaria, typhoid, dysentery, and amoebas is, which can result in miscarriage, forestal death, and maternal mortality (Cameron & Chase, 2021). An estimated eight percent of maternal deaths (and up to 15 percent in lower and middle-income countries) can be directly linked to unhygienic conditions during labor and birth and poor post-natal hygiene. In Indonesia in particular, maternal mortality remains stubbornly high. For every 100,000 live births in 2015, 126 women died. In rural and isolated regions, maternal mortality is as high as 596 deaths per 100,000 live births. These figures are significantly higher compared to neighbouring countries such as the Philippines and Malaysia. A meta-analysis found that women living in households with poor sanitation or poor water supply in Indonesia had on average 3.07 times the odds of maternal mortality compared to women with improved access to sanitation and water (Cameron & Chase, 2021).

Social Impacts

The issue of lack of access to adequate sanitation and clean water has been linked to gender inequality in three areas: menstrual health, maternal health, and gender impacts. Lack of sanitation facilities for girls reaching puberty has made girls more likely to miss school than boys. In 2018 and 2019, between 15% and 25% of girls in Indonesia missed school due to menstruation, which has adverse impacts for the educational level that these girls receive. In addition, women and girls are more likely to be responsible for collecting water for their family. In 2018, women and girls were responsible for water collection in 8 out of 10 households without onsite water supply. These responsibilities have been shown to make it difficult for girls to attend school during school hours.

Economic Impacts of Sanitation and Hygiene

The world is facing an economic loss of 1.5% per year of the global GDP as a result of inadequate services of water supply and sanitation (Hutton & Chase, 2016). The burden of disease and death resulting from poor sanitation costs Indonesia $3.3 billion annually. Approximately 6.3 billion dollars, the equivalent of 2.3 percent of the national GDP in Indonesia, is lost due to health and water-related issues. On a large scale, poor WASH can contribute to welfare losses due to additional time to access unimproved sanitation, tourism losses, and environmental losses due to loss of productive land.The issue of clean water is an economic

issue for every family: households with reduced access to clean water often have to spend time procuring and fetching clean water that could otherwise be used for education or work. Poor sanitation also contributes to $166 million per year in tourism losses, and $96 million in environmental losses due to the loss of productive land (Van Minh & Nguyen-Viet, 2011). While some progress has been made to improve sanitation in Indonesia, progress has been minimal. The UN Development Programme estimates that each dollar invested in water and sanitation yields eight dollars in return, which shows that interventions for hygiene improvement are beneficial and should be seen as a priority by the nation. Most of this return in investment stems from health care costs, access time, and productivity savings. In the recent market assessment on safely managed sanitation conducted by UNICEF Indonesia, there is a huge potential in the sanitation market of up to 8.33 billion USD for one site sanitation. This figure means that achieving safely managed sanitation alone can attract more investments from businesses and private sectors which can in turn positively impact the growth of the Indonesian government. Availability of WASH can also contribute to better service provision and stronger consumer satisfaction. (Cameron, Shah, & Olivia, 2016).

Moreover, improved water and sanitation can also result in a gain property values. The value of property is influenced by the level of services and access to good water and sanitation services. While such gains are large in urban areas, rural households can also benefits.

Barriers to Improved Sanitation & Hygiene

The country's decentralised government, which results from its unique geographical barriers, has made it difficult to implement programs and construction projects to improve sanitation (Satriani, 2022). Policy responsibilities are fragmented between different ministries. Indonesia is governed under 514 local governments, all of whom have different cultures, levels of capacity, and resources (World Bank Group, 2019). This devolution of responsibilities has not been followed by adequate funding to dramatically improve the quality of water supply and sanitation in many regions. Moreover, cross-sectoral policy coordination on the provision of improved facilities for improved water and sanitation facilities has not been adequate. As a result, large disparities exist between rural and urban areas in the country (Bank, 2016). In particular, remote coastal communities are most vulnerable to the adverse effects of inadequate water supply. These communities rely heavily on spring and rainwater, which are unavailable during dry seasons. These people are forced to use contaminated standing water and seawater (Arief, n.d.). Many of these rural communities have scattered settlements which result in high costs of installing a piped network.

There are many factors that can influence lack of access to safe sanitation and hygiene. WASH-related behavioral studies have found that worldwide, factors range from the individual

level/beliefs to broader aspects such as technological, environmental, and institutional factors. For example, water scarcity, an environmental aspect, can influence WASH-related behavior. In East Nusa Tenggara province, for example, households that were interviewed claimed that the lack of water was the reason that they chose not to use the latrine, have baths, or practice handwashing (Daniel et. al, 2021).

Indonesia is one of the rainiest places on earth, with some regions such as the west coast of Sumatra receiving over 400 centimeters of rain a year. However, these rains are often unpredictable and some regions of the country experience severe droughts, which usually occur from April until October. The monsoon season in the country is important for agricultural reasons, but depending on the year, can also affect water levels and quality in a negative manner. This is because the widespread replacement of forests and other vegetation along rivers and watersheds has reduced how much water the landscapes can absorb, which contributes to runoff and flash floods. These forms of water are often dirty, which negatively affects the people in Indonesia. Monsoons often create forceful floods which can ruin sanitation facilities, septic systems, and piping installations, which can reduce people's access to clean water. Heavy monsoon rains can also force citizens to leave their homes, which can detrimentally affect the stability of their water supply.

The country is also prone to many natural disasters as a result of its low-lying position on the equator. These disasters include, but are not limited to, floods, tsunamis, and earthquakes. All of these natural disasters result in destroyed infrastructure, and funding is privatized towards their reconstruction. One example of this was the Aceh tsunami in 2004, which hit the region of Aceh in Indonesia, killing more than 150,000 people and displacing over 500,000. After the tsunami, the area received inflows of aid from international communities and the national government itself, but despite reconstruction efforts, the region remains today as one of the regions with the lowest level of access to sanitation and hygiene systems.

In addition, social norms and beliefs may be difficult to change. In this province, for example, many people that were interviewed believed that diarrhea among children was related to teeth growth and not improper sanitation and hygiene, and were more reluctant to invest and make changes. Other beliefs such as a taboo of using the same facility among certain families has prohibited the widespread use of latrines (Daniel et. al, 2021). Research has also found that in rural areas, the village leader is the most important actor who influences the sustainability of WASH services in the area (Daniel et. al, 2021). As a result, these interventions should place focus on people who are in positions of authority but who the members of the community respect.

Policy Analysis of Water, Sanitation, and Hygiene (WASH) Systems in Indonesia

Chapter 2

Strategies to Improve WASH Systems in Indonesia

The country has implemented three primary interventions in order to improve the quality of sanitation and hygiene: microfinance programmes, educational campaigns focused on elementary schools, and Sanitasi Total Berbasis Masyarakat (translated to Community Based Total Sanitation), the national community-led sanitation programme. Microfinance programmes have been used as a popular poverty alleviation tool to increase the well-being of its citizens, and to help encourage the growth of key facilities for sanitation and hygiene (Murat, Willets, & Triwahyudi, 2016). This intervention involves offering loans, savings, insurance, and payments to small-scale entrepreneurs and households in order to have them build sanitation facilities in their local communities (Davis et. al, 2008). In addition, another approach that the country has taken to improve hygiene is to focus on educating students on the importance of good hygiene practices and improving sanitation facilities in schools. Schools which focused on enforcing handwashing and other practices were found to have a lower risk of diarrhoea and other types of fecal-oral diseases (Karon et. al, 2017). The country has also incorporated what is known as the Sanitasi Total Berbasis Masyarakat (STBM), which is a community-led sanitation programme that seeks to ensure open-defecation free communities, handwashing, household water treatment and safe storage of water and food, solid waste management, and liquid waste management. This intervention promotes a highly decentralised approach, which has resulted in an uneven distribution of sanitation facilities across the country (Chambers, 2009).

Many of the interventions that are used in Indonesia are organised and directed by local governments, non-profit organisations, and foreign aid. The national government has promoted a heavily decentralised approach to address this issue of sanitation and hygiene, most notably through financial assistance towards the STBM programme, particularly for rural communities. In addition, they have also provided support towards the IUWASH programme sponsored by USAID. The IUWASH program, known as the Urban Resilient Water, Sanitation, and Hygiene Activity aimed to achieve higher quality levels of sanitation and hygiene in urban areas. The project was a 40 million dollar five-year long effort between 2011 to 2016 that operated in more than 50 Indonesian municipalities. In addition to government aid, the project also mobilised the private sector, including a successful one million dollar commitment from Coca-Cola for water replenishment programmes. In 2016, USAID renewed this program in a

project referred to as IUWASH-PLUS, which was another five-year long effort that ended in 2021.

Purpose of Policy Analysis

The purpose of this study is to analyse the effectiveness of the programmes used in Indonesia to improve sanitation and hygiene. I will be conducting a policy analysis that will explore the effectiveness of microfinance programmes, educational programmes, and the STBM programme in the context of the Indonesian environment. With this information, I hope to identify the advantages and disadvantages of these programmes, along with how it takes into account different dimensions of health in order to increase the efficacy of them. It is important that as has just been done, the context of the problem should be addressed. Countries vary enormously in terms of geography, politics, economics, culture, and the organisation of their health systems. In every country, including Indonesia, health policy mirrors political, economic, and social pressures, as well as national values and priorities. Providing context and a profile of the country and regions affected will help to set the foundation for an effective policy analysis in this chapter.

Methods

I conducted a policy analysis by implementing a multi-dimensional analysis. I will use the rational policy analysis model (Collins, 2022). According to Collins, a policy analysis is "the disciplined application of intellect to public problems (Collins, 2022)." This type of analysis is the most effective format in which to evaluate the effectiveness of different interventions that have been implemented in the country. My analysis takes on the following framework:

1. Identify potential policy options (alternatives) to address the problem.
2. Specify the objectives to be attained in addressing the problem and the criteria to evaluate the attainment of these objectives as well as the satisfaction of other key considerations
3. Assess the outcomes of the policy options in light of the criteria and weigh trade-offs between the advantages and disadvantages of the options.
4. Arrive at a recommendation (Meltzer & Schwartz, 2019).

As a result of limited time and money, I used secondary data including published academic sources, program reports, historical and practical documents written by programme advocates, summaries of interviews conducted by others with key informants of these programmes, and important policy documents in order to analyse the effectiveness of these programmes. Using

these sources, I evaluated the programmes implemented in Indonesia by looking at their relevance to the target population, the progress and results, efficiency, effectiveness, and overall impact of the programme. My sources were then compiled into a policy analysis in which I will be qualitatively describing my findings.

In this policy analysis, I analysed the effectiveness of microfinance programmes, educational programmes, and the STBM programme in Indonesia in relation to how it has improved sanitation and hygiene in the country. I did not analyse the IUWASH and the IUWASH-PLUS programme as this was a short-term project that will be hard to replicate in the future.

In order to provide a holistic analysis that evaluates various facets associated with a particular intervention, I used the following criteria:

a. Cost: achieving policy goal at the least cost
    i. This is determined by identifying the total cost per capita of the specific intervention
b. Time: how time-efficient the policy has been to implement intervention
    i. This is determined by identifying how long the intervention would take to implement, and whether there would have to be follow-up procedures that would extend the overall length of the project
c. Equity: level of fair social allocation and benefits amongst social groups
    i. This is determined by identifying what populations are directly and indirectly affected by the implementation of the policy, and whether underrepresented populations are positively affected
d. Effectiveness: has the valued outcome of the policy been achieved
    i. This is determined by identifying whether the policy achieves the given policy goal of improving sanitation and water sources and improving health conditions resulting from improper WASH services, such as fecal-oral disease and stunting

Each programme was assigned a rating between 1 and 5, with 1 being the least effective and 5 being the most effective in regards to each criteria. Each metric was weighted equivalently to find a mean overall score. I assessed the outcomes of the policy options in light of the criteria and weighed trade-offs between the advantages and disadvantages of the options in order to provide recommendations for what Indonesia should do in the future in order to most efficiently improve their sanitation and water access for their citizens.

Each metric is weighted equivalently to find a mean overall score.

Criteria:	1	2	3	4	5
Cost	high-cost (one-time fixed-costs such as capital expenditures, equipment, training; operation and maintenance costs such as the ongoing costs of the policy)	medium-high cost (one-time fixed-costs such as capital expenditures, equipment, training; operation and maintenance costs such as the ongoing costs of the policy)	medium-cost (one-time fixed-costs such as capital expenditures, equipment, training; operation and maintenance costs such as the ongoing costs of the policy)	medium-low cost (one-time fixed-costs such as capital expenditures, equipment, training; operation and maintenance costs such as the ongoing costs of the policy)	low-cost (one-time fixed-costs such as capital expenditures, equipment, training; operation and maintenance costs such as the ongoing costs of the policy)
Time	policy takes a long time to implement (including initial implementation, maintenance, and follow-up time)	policy takes a medium-to-long time to implement (including initial implementation, maintenance, and follow-up time)	policy takes a medium length time to implement (including initial implementation, maintenance, and follow-up time)	policy takes a short-to-medium time to implement (including initial implementation, maintenance, and follow-up time)	policy takes a short time to implement (including initial implementation, maintenance, and follow-up time)
Equity	heavy disparities among affected target populations (underrepresented populations such as women, children, and rural areas are adversely affected, there is no fair social allocation and benefits among groups)	many disparities among affected target populations	some disparities among affected target populations (underrepresented populations such as women, children, and rural areas are somewhat positively affected, there is some fair allocation and benefits among groups)	few disparities among affected target populations (underrepresented populations such as women, children, and rural areas are mostly positively affected, there is mostly fair allocation and benefits among groups)	no disparities among affected target populations (underrepresented populations such as women, children, and rural areas are positively affected, there is fair social allocation and benefits among groups)
Effectiveness	low level of effectiveness (valued outcome of policy has been achieved, improved sanitation and water sources, decreased prevalence of WASH-related conditions such as fecal-oral disease and stunting)	low-to-medium level of effectiveness (valued outcome of policy has been achieved, improved sanitation and water sources, decreased prevalence of WASH-related conditions such as fecal-oral disease and stunting)	medium level of effectiveness (valued outcome of policy has been achieved, improved sanitation and water sources, decreased prevalence of WASH-related conditions such as fecal-oral disease and stunting)	medium-to-high level of effectiveness (valued outcome of policy has been achieved, improved sanitation and water sources, decreased prevalence of WASH-related conditions such as fecal-oral disease and stunting)	high level of effectiveness (valued outcome of policy has been achieved, improved sanitation and water sources, decreased prevalence of WASH-related conditions such as fecal-oral disease and stunting)

Each evaluation criteria has been elaborated with supplemental research relating to each program. In addition, I have included a case study for each program that has helped to provide insight into the program details for a specific region/time period in Indonesia.

Each evaluation has been converted into two graphics. The first graphic highlights each criteria with a particular color, with the intensity of the score color corresponding to its score (ex: a score of 5 would have a darker color than a score of 1). The color for each criteria is identified below:

Cost = RED 1 2 3 4 5
Time = GREEN 1 2 3 4 5
Equity = BLUE 1 2 3 4 5
Effectiveness = PINK 1 2 3 4 5

Policy #1: Microfinance Programs

Microfinance is a popular poverty alleviation tool in developing countries to help upgrade slum areas and to build key facilities such as those for sanitation and hygiene (Murat, Willets, & Triwahyudi, 2016). It has been a popular tool that has been utilised since its development in the 1970s in Bangladesh by Grameen Bank. This intervention is usually associated with funding income-generating activities for small-scale entrepreneurs. Through the provision of microfinance to both households and small businesses, these people are able to invest in sanitation services such as latrines, rainwater harvesting tanks, dug wells, pumps, and septic tanks (Davis et. al, 2008). For low-income households, accessing WASH infrastructure is not cheap. Research has found that in parts of Asia, building private toilets can cost up to $400 for a household, while piped water connections cost around $150. Microfinance programmes can come in a multitude of services, including loans, savings, insurance, and payments. The entities that provide these services include organisations for profit and non-profit, traditional banks, and self-help groups (DeLoach & Lamanna, 2011). Helping households to cover these costs is of paramount importance when it comes to boost an increase in sanitation coverage across Indonesia. Access to these microfinance programs can prompt households to invest, and allows them to upgrade to improved latrines (Davis et. al, 2008). The premise of these types of programmes is that if investments were to be staggered over time and payments were made more in line with household cash-flows, the demand for WASH infrastructure and services would likely go up. Financial help in this form can play a catalytic role in increasing the uptake of WASH improvements by poor households. Globally, the microfinance market for WASH sits at around $12 billion, which makes a strong business case for various organisations to offer these loans (Natu, 2014).

In Southeast Asia, which includes Indonesia, the potential demand for microfinance across different WASH segments is presented below:

Use	**Borrowers (in millions)**
Urban Water	7.5
Rural Water	5.0
Urban Sanitation	23.2
Rural Sanitation	17.3
Total	53.0

Table 2. Potential Demand for Microfinance across WSS Segments in Southeast Asia (Mehta, 2008)

Based on this information, it is interesting to see that most borrowers for WASH improvement stem from urban areas. This is important to note when analysing the equity and distribution of these microfinance programs.

Indonesia's microfinance industry is one of the oldest, largest, and most commercialised in the world (DeLoach & Lamanna, 2011). It has expanded and increased since its introduction in the eighties. In Indonesia, the USAID-funded Indonesia Urban Water, Sanitation and Hygiene (IUWASH) project has helped more than 186,000 people gain access to improved sanitation. In 2015, the IUWASH project led a microfinance scheme in the Probolinggo District of East Java, Indonesia, and was able to help 50 households in the area build proper toilets in their homes. This project has partnered with a local cooperative, KPP-UMKM Syariah, to provide microfinance services to local families so they can build safe and hygienic bathrooms. This project provides loans to local families that are meant to be paid back in the future to help those without access to toilets to be able to build one. In most cases, the loans are given to women, who are more prone to actually use the money to build sanitation facilities to improve the health outcomes of their families. This program trains individuals to become small-scale construction contractors in order to help build new systems ("Real impact: Indonesia - USAID.GOV," n.d.).

When microfinance programmes were first implemented, they were seen as the holy grail solution to alleviating poverty in all countries. However, problems that have risen from these programmes have shattered this illusion. Microfinance programmes can have limited effects of

success on the populations they target, as they do not actually bring people out of poverty. Often, it is a short-term solution to a long-term problem. It also alleviates the burden of dealing with sanitation and hygiene for the national government, and may hinder overall progress in this sector (Natu, 2014).

Case Study:

Improved water and sanitation has been catalyzed by a multitude of microfinance organisations, one of which is Koperasi Syariah Benteng Mikro Indonesia (KBMI). KBMI is an Islamic, member-owned cooperative and microfinance institution in Jakarta. KBMi provides loans that adhere to Sharia principles of the Islam religion and provide loans in order to improve sanitation and hygiene among low-income households. Mothers were able to take out loans of around $500-600, which allowed them to invest in clean water facilities which benefited their entire family. The microfinance loans are only allowed to be taken out if training towards the importance of sanitation and hygiene is completed to deter families from using the loans for another pressing matter. This organisation has helped over 30 families have access to clean water and sanitation, although it was found that this program was associated with a higher level of sanitation access as opposed to water access.

Criteria:	Score:
Cost	3
Time	4
Equity	4
Effectiveness	2

Table 3. Evaluation of Microfinance Programmes



Figure 5. Radar Chart Evaluation of Microfinance Programmes

Overall Score: 3.25

Cost: 3

Overall, microfinance programs are not very expensive to implement, especially as the premise is that the organisations and loaners that are offering money are expected to be paid back in the future (Davis et. al, 2008). These programs have been seen as an outlet for people who have no access to money to build better sanitation and hygiene facilities. While the cost of the loans themselves are not very expensive, they can cause a significant burden on families and communities who use them, as the cost of one latrine is equivalent to 92 percent of the average income of an Indonesian household per year.

Time: 4

Microfinance programs are very time-effective. Offering microcredit to households and communities does not involve a timely process, and after construction of the sanitation and water facilities, improvement is seen almost immediately and does not require multiple check-ins. The loan repayment process may take an extended period of time, however, which can reduce the credibility of the programme in terms of the time necessary to implement it (DeLoach & Lamanna, 2011).

Equity: 4

Interestingly, microfinance programmes are one of the key ways in which women are able to play a critical role in improving sanitation and hygiene, so in this way, children and women are able to benefit from the construction of projects that are funded through microfinance programmes. In fact, these programmes target women because they have been shown to have disciplined spending, careful investment habits, and better repayment (Halimatussadiah & Moeis, 2022). Unfortunately, while the programme is intended for families who would not otherwise be able to afford WASH construction projects, it simultaneously marginalises the population that are unable to pay back the microcredit loans, and forces families to prioritise sanitation and hygiene over other important financial decisions they must make (Davis et. al, 2008). In addition, a cost breakdown of the borrowed loans in Table 1 shows that more borrowers are from urban regions, which may increase disparities across different regions (Mehta, 2008).

Effectiveness: 2

Microfinance programmes have been shown to have an overall positive impact on sanitation facilities and effects of fecal-oral diseases (Davis et. al, 2008). Microfinance programmes have been associated with better household sanitation and hygiene in communities, with a significantly better outcome for sanitation access as opposed to water access. This is most likely

because households have more control on the type of facility being constructed for sanitation than for water due to many compounding factors such as the available source of water and supply provider. The skills required for making sanitation improvements can be easily acquired from local masons or even the heads (husbands) of households. However, the constructions necessary for implementing water improvements require more specialised providers, which are much harder to find and access.

Despite these successes, however, microfinance programs are disadvantageous because they have been shown to often trigger investment in relatively poorly constructed toilets that are prone to collapse and need to be frequently rebuilt (Hartungi, 2007). A study conducted in 2009 found that the minimum cost of constructing a latrine reached 92 percent of a poor household's annual income, which is very expensive. As a result of the fungibility of the loan funds, it was also found in one study that 29 percent of borrowers did not have water facilities on their premises, which indicates that the money loaned was used for other purposes rather than sanitation and water access. They also may place excessive burdens on communities, which consequently weakens the state's capacity to deliver public services and may devalue the importance of prioritisation of improving hygiene for the national government (Hadi et. al, 2015). There are also some instances in which money that is loaned for the purpose of improving WASH infrastructure is used for other more pressing needs. In addition, it is also important to note that in many cases, communities themselves are expected to initiate the borrowing of these loans, which can only be done if there is some level of education in the community regarding the adverse impacts of inefficient sanitation and hygiene measures. According to the Bill & Melinda Gates Foundation, a review of microfinance programs for WASH suggests that while there are many pilots, very few have achieved scale (Mehta, 2008). The review also highlights that only a few large MFIs show an interest in the water and sanitation sector, because it continues to be relatively unknown and is perceived as high risk. Therefore, microfinance programmes as a sole strategy to improve access to sanitation and hygiene are ineffective.

Policy #2: Educational Campaigns

Another approach that some regions in Indonesia have focused on is to reach out to students and educate them on the importance of good sanitation and hygiene practices. School-age children make up the largest proportion of Indonesian youth population. The primary education sector in Indonesia is the third largest in the world with over 30 million students and two million pre-primary and primary school teachers. Government expenditure on education in Indonesia is 3.4% of GDP or 17.6% of total government spending. In this country, an estimated 12% of children between five and fourteen years old wash their hands with soap after defecating, 14% wash their hands with soap before eating, and 35% wash their hands with soap

after eating (Torlesse et. al, 2016). The primary education sector in Indonesia is the third largest in the world with over 30 million students and two million pre-primary and primary school teachers (Silva & Sumarto, 2018). A handwashing with soap intervention in schools was shown to significantly reduce pupil absenteeism by 21-54% (Joshi & Amado, 2013). Moreover, building separate toilets in schools is also essential to promoting gender equality, guaranteeing privacy and dignity. Research has found that globally, as a result of inadequate sanitation facilities in schools, one in five adolescent girls drop out of school, especially when they have their period.

Having a deeper understanding of the ways in which proper sanitation is linked to reducing the risks of disease can encourage the demand for sanitation facilities and also improve hygiene practices. One programme that has focused on integrated education and hygiene interventions is the Fit for School (FIT) programme (Duijster et. al, 2017). This programme focused on targeting children attending public elementary schools by having them having daily group handwashing with soap and tooth brushing with fluoride toothpaste, biannual school-based deworming, and the construction of sanitation facilities. In all the schools that had incorporated the FIT programme, children practiced hand washing more, and this intervention alone was found to prevent around one-third of diarrhoea episodes in children.

Case Study:

Between 2011 and 2013, a partnership was formed between the Indonesian government, UNICEF, CARE, and Save the Children. This was known as the WASH in Schools Empowerment (WISE) Program ("Programs: WISE - wash in Southeast Asia," 2019). The goal of this programme was to improve the well-being of children through the integration of water and sanitation facilities and hygiene activities in primary schools. These schools incorporated toilet and handwashing facility construction, hygiene promotion, water point rehabilitation, and strengthening of school committees to create participatory-based chocolate action plans regarding sanitation programs (Adams et. al, 2009). These committees consisted of both parents and teachers, and the inclusion of parents also helped to educate adults about the importance of hygiene practices. This intervention was implemented in six districts across South Sulawesi, Nusa Tenggara Timor, Papua and West Papua provinces. This intervention helped to promote behavior changes among children, decrease the rates of absenteeism at these schools (particularly for the case of females), and raise awareness for hygiene and sanitation among both students and parents (McMichael, 2019). One study found that after a school incorporated an educational campaign to teach the health benefits of handwashing, the prevalence of fecal bacteria on students' hands significantly decreased (Torlesse et. al, 2016). However, the effectiveness of this programme should be overstated, as the evaluation found that teachers received limited support to utilise their improved knowledge in order to promote behaviour

change among students. Teacher engagement with sanitation staff was mainly restricted to infrequent training events with very little follow up and in-school coaching how to apply and adapt learning in the school context. In addition, the WISE program in particular tried to organise community activities, such as Global Hand Washing Day celebrations, but was met with limited engagement within the broader community (Torlesse et. al, 2016).

Criteria:	Score:
Cost	3
Time	2
Equity	3
Effectiveness	3

Table 5. Evaluation of Education Programmes

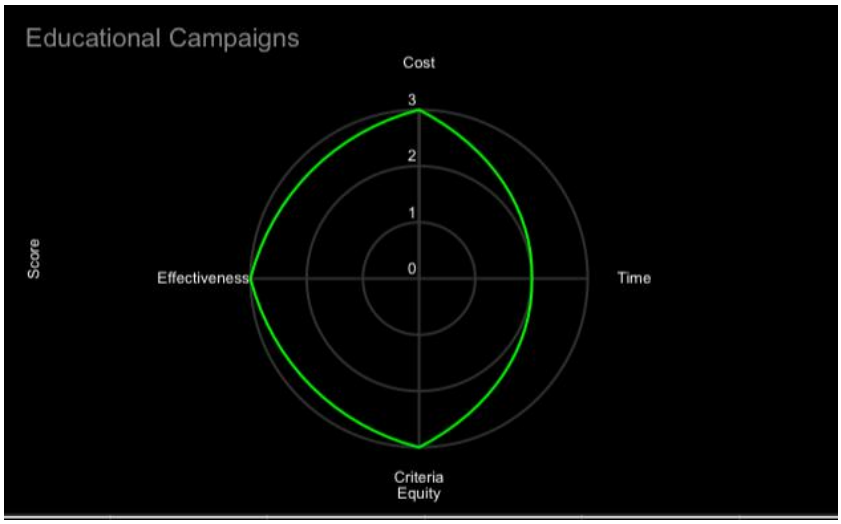


Figure 6. Radar Chart Evaluation of Educational Programmes

Overall Score: 2.75

Cost: 3

Overall, educational campaigns are moderately expensive to implement, as the government must take into account software costs (education, promotion, administration, and staff costs), hardware costs (capital costs of infrastructure and hardware), and recurring costs (i.e., hardware that needs to be replaced on an ongoing basis, consumables, cleaning, operation, and maintenance costs) (Duijster et. al, 2017). However, while these are a lot of costs to factor in, the advantage to educational campaigns is that they are focused in school buildings, and are therefore cheaper than focusing on sanitation for each building within a community, which makes them more cost-effective than other programs that seek to improve WASH systems for various populations (McMichael, 2019).

Time: 2

Educational campaigns are not as time-effective as other strategies to improve sanitation and hygiene behaviors within a community. For this strategy to be truly effective, children would have to take the information they learn in school about sanitation and hygiene and influence their families to also make lifestyle changes, which would most likely take a substantial amount of time. Educational campaigns, combined with new infrastructure which would encourage children to practice safer sanitation practices, would require time in order to effectively implement. Moreover, this strategy requires a large amount of organization and cooperation among individuals and groups, which could also prove to be a hindrance to being time-effective (McMichael, 2019). In addition, educational school programs are complex, requiring ongoing monitoring. The challenge is capturing enough valid and reliable information to make informed programmatic changes without unduly burdening school administrations (Graham, 2015).

Equity: 3

On a superficial level, educational campaigns are not very equitable, as they target a very specific audience (young children of primary-school age). Moreover, it is important to note that the attendance for males is higher in schools in Indonesia than for females, which could also adversely impact the equity of who the educational campaigns benefit (Adams et. al, 2009). However, research has proven that focusing on schools as the main demographic within communities can have an overall positive impact on the remaining population, as these behaviors and practices are often incorporated by other family members who are taught the importance of practicing good sanitation and hygiene. In addition, there have been efforts to have educational campaigns in schools in both urban and rural areas, which has made this strategy more equitable from a regional standpoint (Joshi & Amado, 2017).

Effectiveness: 3

It was found that schools that incorporated educational programs within their schools were able to retain more students and reduce pupil absenteeism. Overall, these educational programs were able to accomplish their goal of reducing levels of fecal-oral diseases among children. One randomized control trial found that WASH educational programs in schools reduced the risk of diarrheal disease by 66% in the intervention group of students compared to controls. While the assumption with educational campaigns is that families of children will learn the behaviors that their children learn in school, there has been limited research to prove that this is in fact true (Joshi & Amado, 2017). Moreover, this strategy cannot be used exclusively, as the other members of the community may be well-educated on sanitation practices but may be unable to afford the infrastructure necessary in order to improve (Silva & Sumarto, 2018). Through further insight into the case study mentioned in this analysis, it was found that the disparity

between the school and community as well as under-resourced teachers within the school limited the success of the program.

Policy #3: STBM

Sanitasi Total Berbasis Masyarakat (STBM) is the Indonesian concept of what is known as the Community-Led Total Sanitation ("Indonesia: Community-Led Total Sanitation," 2016). The programme was proposed in late 2003 by Indonesian field staff from the World Bank's Water and Sanitation Program (WSP). The model was derived from one used in rural Bangladeshi villages. This new approach focused on self-motivated, community-level behavior change. This programme seeks to target five pillars, which references Islam, the primary religion of this country. The five pillars are 1) open-defecation free (ODF) communities, 2) handwashing with soap at critical moments, 3) household water treatment and safe storage of water and food, 4) solid waste management and 5) liquid waste management. In addition, STBM advocates a subsidy-free approach to sanitation and practices a highly decentralised approach. Although this programme has been initiated by the national government, it is strictly dependent on district mayor support to approve funding for STBM-related activities, which has resulted in uneven implementation across the country (Bank, 2016).

In 2005, this programme launched trial runs in seventeen communities, and the success of these trials led to the expansion of this program throughout the rest of the decade. Many communities which participated in this programme were able to quickly achieve ODF status. Between 2007 and 2010, the programme cost approximately 14 million USD. A subdivision of this programme, known as SHAW (the Dutch Sanitation, Hygiene and Water Program for Eastern Indonesia) was implemented in nine districts in Eastern Indonesia from 2010-2015. During this period, a total of 802 villages were declared 100% STBM, and this initiative benefitted around 1.45 million people (Venkataramanan et. al, n.d.). Despite its positive health impact, the programme has not increased equity in sanitation access. The majority of the construction and increased toilet facilities have been incorporated into the houses of wealthier families, leaving poorer families unable to afford improved sanitation. Even still, poor families benefited from these community-wide sanitation advances, because the prevalence of disease was lowered in the community overall (Chambers, 2009).

STBM works in different ways depending on the specific region it is focusing on. Indonesia is a very geographically diverse country, and different programs target specific regions. In general terms, the STBM programme is applicable to urban areas as well as rural ones, especially in triggering behavioral change. However, its methods and strategies require adaptation and innovation as rural communities differ from their city-dwelling counterparts in terms of technology, surroundings, and the higher prevalence of individualism among the latter group. In

most rural areas, this programme has increasingly focused on better supporting sanitation behavior change rather than just allocating budgets for the construction of communal physical facilities. This is because in the past, latrines/community toilets built through subsidies and fully rants were not well-maintained and used in many cases. In urban areas, there is a focus on septage removal and treatment, along with the education of how to dispose of trash (Sigler et. al, 2014).

The STBM approach is known to first increase demand for good sanitation. The premise of the programme is designed to instill feelings of shame in people who practice open defecation, which leads them to seek improved sanitation ("Indonesia's total sanitation and Sanitation Marketing Program," n.d.). This method, in practice, has the potential to mobilise entire villages by drawing on their collective identity to change long-standing social norms. Villagers are invited to attend a number of sessions in which a trained facilitator mapped out the areas where community members lived, drew water, and defecated. The facilitator then leads community members on a walk throughout the surrounding area, identifying human waste and attempting to trigger feelings of shame and disgust. This can be done in a number of ways, such as dipping a hair in feces, and then dipping the same hair in a glass of drinking water. When asked to drink the contaminated water, villagers would refuse, and this would lead many to the realisation that their daily defecation practices promoted this form of contamination, albeit less obvious. After this rather shocking experience, the facilitator would continue by educating communities on the health risks of open defecation in order to create a sense of urgency to fix the problem.

Case Study:

Over 350 villages in the districts of North and South Timor Tengah in the Nusa Tenggara Timor Province have successfully implemented the STBM programme between 2010 and 2013 ("362 Villages in East Nusa Tenggara, Indonesia Broke MURI's Record," n.d.). Through this programme, over 600,000 community members have learned about the importance of sanitation and benefitted from the adoption of hygienic measures. The STBM programme took into account the five pillars, including stop open defecation, handwashing with soap campaign, drink water management, solid waste management, and household liquid waste management. This specific regional programme was supported by local NGOs in the area and in the Netherlands. As a direct result of STBM, the residents of this region have not suffered from widespread cases of diarrhea due to epidemics, as was the case every year until 2012. The North Timor Tengah District Health Department stated that the number of diarrhea cases has decreased from 2.111 cases in 2010 to 1.752 case in 2013 and is further projected to decline in the future.

Criteria:	Score:
Cost	2
Time	3
Equity	4
Effectiveness	4

Table 5. Evaluation of STBM Programmes

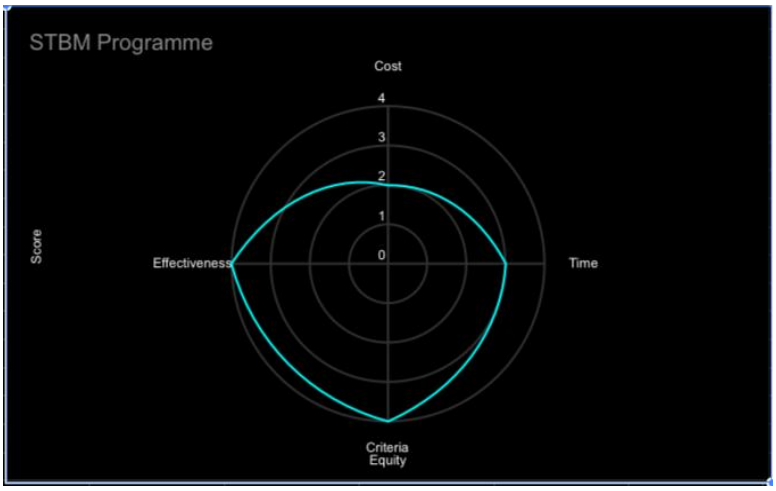


Figure 6. Radar Chart Evaluation of Educational Programmes

Overall Score: 3.25

Cost: 2

The STBM programme is the most aggressive program that the country has pursued in regards to improving levels of sanitation and hygiene within the country (Chambers, 2009). Hardware investments make up the bulk of the budget of the programme, and must be funded mostly by the national government while keeping costs low at a district level in order to be most effective. The STBM programme involves paying for infrastructure for communal spaces and effective wastewater management, sanitarians, and training for community members. However, in many cases, this program is spearheaded by community members themselves after initial steps have been taken, and therefore does not usually require recurring costs from the district and national governments (Odigari et. al, 2020).

Time: 3

Many communities which have implemented the STBM programme have been able to see progress in a relatively short amount of time. Community facilitators are able to teach a community about the importance of sanitation and hygiene in as little as one session, and after infrastructure has been constructed, the rates of hygiene-related diseases can be expected to be reduced. Most STBM programmes require organization from both a national and district level, which can reduce the efficacy of the programme (Cronin et. al, 2017). In addition,

sustaining ODF status remains a challenge and needs to be comprehensively addressed if countries are to maintain continued progress.

Equity: 4

One of the main goals of the STBM programme is to make it as equitable as possible, and the programme is designed with this goal in mind. STBM programmes primarily target rural communities with otherwise very low levels of sanitation and hygiene (Odigari et. al, 2020). It seeks to involve the entire community's population in order to change practices and behaviors. Despite this, it often favors the wealthier populations in a particular community, as the majority of the construction and increased toilet facilities are constructed in the houses of wealthier families, leaving poorer families unable to afford improved sanitation. Even still, poor families benefit from these community-wide sanitation advances, and it has been found that these changed social norms are important not just for political will and community motivation but also to effectively impact on the negative health externalities of unsatisfactory sanitation and hygiene (Sigler et. al, 2014).

Effectiveness: 4

There is considerable evidence that the STBM programme is very effective in working to reduce rates of fecal-oral disease and improve the behaviors of community members. The prevalence of disease is lowered, and overall behaviors relating to sanitation and hygiene are shown to be improved (Bank, 2016). The programme has been successful in accelerating access to rural water supply and sanitation. The five pillars of sanitation allow for an organised system in which it is more efficient to measure effectiveness of the program. As a result of this programme, there have been an estimated 9,000 verified ODF villages as of 2017 (Cronin et. al, 2017). Despite the high level of overall effectiveness of the STBM programme, progress has been noticeably slow on part of Indonesia's sub-national (mainly district) governments who hold the responsibility for front-line sanitation service delivery to communities. Greater progress is inhibited for a range of reasons including a) decentralisation of the government system which has seen a disconnect between national and lower levels of government, b) limited sector knowledge and experience of local level governments, and c) lack of investment in STBM at district level with resources being prioritised for other areas such as infrastructure ("Indonesia: Community-Led Total Sanitation," 2016).

Analysis of Findings and Recommendations for the Future

Chapter 3

Analysis of Strategies

Following the policy analysis in which I individually reviewed each WASH strategy based on a set list of criteria, it is now critical for a more holistic analysis to be performed that pits each strategy against each other. This is necessary for a thorough analysis which will further allow for a rational approach to the recommendations in the future.

Based on the analysis completed previously, the STBM and microfinance programmes were ranked as the best overall policies with an overall score of 3.25, followed by the educational programme with an overall score of 2.75. A breakdown of the rankings of the strategies can be seen below.

It is important to note that despite their successes, none of the programmes had a perfect success rate. Each programme would need to improve upon its shortcomings in order to maximise the success rate to improve water and sanitation services in the country.

Criteria	**1**	**2**	**3**	**4**	**5**
Cost		STBM Programme	Microfinance Programme, Educational Programme		
Time		Educational Programme	STBM Programme	Microfinance Programme	
Equity			Educational Programme	Microfinance Programme, STBM Programme	
Effectiveness		Microfinance Programme	Educational Programme	STBM Programme	

Criteria	Highest	Medium	Lowest
Cost	Microfinance Programmes, Educational Programmes		STBM programme
Time	Microfinance Programmes	STBM Programmes	Educational Programmes
Equity	STBM Programmes, Microfinance Programmes		Educational Programmes
Effectiveness	STBM Programmes	Educational Programmes	Microfinance Programmes
Overall Score	STBM Programmes Microfinance Programmes		Educational Programmes

Barriers

The most obvious barrier that the country faces in regards to improving access to water and sanitation sources is geography and lack of communication between local governments and the national government (Satriani et. al, 2022). It is important to consider which level of governance would be ideal to infuse money into for the most rapid and effective change in WASH systems. Corruption and the political culture in the national government have greatly diminished the government's ability to deliver quality public services. One major problem on this governmental level is the fragmentation of structures, policies, and programmes on safe water, sanitation, and hygiene (Odagiri et. al, 2020). However, a lack of general knowledge and experience amongst local governments also provides a barrier, as money intended for WASH systems can often be redirected for what is deemed as more pressing. Historically, public investment in the sector has been low. This is particularly true in the case of the sanitation sector. Until the mid-2000s, most GOI institutions and local governments viewed sanitation as a household issue, and as a consequence, public investment has been negligible ("Indonesia Water Supply Sector Assessment - Asian Development Bank," 2022). Often, these investments are not made with complementary "software" investments, and many districts lack budgets, capacity, staff, and technical capabilities to adequately manage and maintain the infrastructure. When households have invested in toilets, other essential infrastructure such as septic tanks

have been missing or substandard. Many initiatives that have been created to target the poor with cost-effective sanitation technologies such as communal septic tanks and share facilities have been met with backlash. This is a result of highly subsidized infrastructure, which limits the ability to scale up these solutions (Yoshino, 2019).

In addition to the country's decentralisation, it is important to note the context of Indonesia's rapid urbanisation and population growth. The country's rate of urbanisation is the fastest of any major economy in East and South Asia, and strategists predict a declining urban water supply coverage at a rate of about 2.2 percent per year ("2020 Country Overview Indonesia - Sanitation and Water for All," 2020). Demographic trends indicate that all of Indonesia' future projected population growth will occur in urban areas, which are growing at a rate of 2.60 percent versus -0.40 percent in rural areas. Focus should be put on both urban and rural areas. Although urban areas typically have more access to WASH services, they also require increased long-term intervention and maintenance as a result of increased use. Citizen and civil society involvement is a key aspect for effective water supply and sanitation planning and development, but often, programs which are implemented lack mechanisms to ensure this engagement (Bouman-Dentener & Devos, n.d.). It is also important that rural and underrepresented populations, such as women and children, are represented.

In the past 20 years, Indonesia has undergone a remarkable transformation to reduce poverty and create a growing middle class (Irianti & Prasetyoputra, 2021). However, this economic growth has primarily benefited the richest 20 percent and left the remaining 80 percent of the population behind. The country's level of inequality is considered to be relatively high compared with other Asian neighbors (Irianti & Prasetyoputra, 2021). This inequality is also reflected in access to WASH systems, and should be considered when deciding which regions and populations to focus on.

In addition to ineffective governance, Indonesia's geographical challenge can have destructive effects on water and sanitation. Due to its position on the boundary of three major tectonic plates, earthquakes and tsunamis are common, which can destroy facilities for wastewater treatment and hinder progress in developing infrastructure necessary for safe water and sanitation (Khairiyah, 2020). For example, on September 28, 2019, a 7.4 magnitude earthquake struck the island of Sulawesi. This destroyed many existing water systems, and many rehabilitation efforts had to focus on access to clean water afterwards ("WASH Recovery Program in Central Sulawesi," 2022). In order to ensure safe WASH systems, it is necessary that the quality of facilities is considered, and funds are directed to disaster prevention in order to mitigate the spread of disease after natural disasters that are linked to lack of access to clean water and sanitation.

It is also important to note that another barrier to improved WASH services is that water access in Indonesia is underpinned by readily available water resources. The country's changing precipitation patterns, population growth, and unsustainable use driven by agriculture have resulted in parts of Indonesia, especially the heavily populated island of Java, facing water scarcity (Khairiyah, 2020). The country has a tropical climate with two seasons, wet and dry. As a result, there is unbalanced fresh water availability. One example of this is that Java, around 7 percent of the total land area of the country, is home to 65 percent of the total population while only having 6 percent of the total available freshwater (Carrard et. al, 2019). Nationwide, only approximately 30 percent of the groundwater resources are consumable. The prospect of a rapidly increasing urban population, paired with increasingly scarce water sources and reduce access to water supply and sanitation poses an important threat to the nation's stability (Khairiyah, 2020).

Discussion

In order to determine the most effective strategy for distributing money for WASH systems in Indonesia, I conducted further research into other countries which face similar challenges related to the decentralisation of their government and natural disasters. The Philippines is an island-nation that shares these similarities with Indonesia, and has also been struggling to expand their safe water supply levels. In the Philippines, rural and isolated communities are much more vulnerable to lack of access, and various projects are aimed at alleviating this burden (Press, 2023). The country has partnered with many external development agencies such as the German Corporation for International Cooperation (GIZ) and the World Bank in order to support rural water supply and sanitation (Bennett, 2012). GIZ sought to overcome institutional confusion and to strengthen governmental organisations at the national, provincial, and municipal levels. They helped to fund low-cost options for sanitation, such as urine-diverting dry toilets and constructed wetlands, which were created to help treat wastewater (Vally et. al, 2019). Indonesia can seek foreign loans and assistance to fund construction of WASH facilities, and also take into account different options that would suit different budgets on a provincial level.

The Philippine Water and Supply and Sanitation Master Plan (PSWSSMP) focuses on eight key reform agenda: establishing effective water supply and sanitation sector institutions, strengthening the regulatory environment, creating and ensuring effective water supply and sanitation services, balancing water supply and demand, building climate resilience, enabling access to financing, managing data and information to determine baseline and gaps of investments, and driving research and development in the sector (Angeles, 2022). While Indonesia also has ambitious goals for the improvement of WASH systems in the country, there

seems to be less of an emphasis on the link between climate change and water supply. Prioritizing climate resilience could have co-benefits with water and sanitation levels in the country (Roma & Jeffrey, 2010). The country is one of the most vulnerable countries in the world for climate change as a result of its low-lying islands (Vally et. al, 2019). Some of these impacts are related to increasing water-related natural disasters and water-horned disease outbreaks. WASH services may also be impacted by damaging infrastructure through droughts, floods, etc. In addition, the initiative for research and development is not stated as a primary objective to improve water and sanitation. Seeking new, cost-efficient technology could help to increase WASH coverage in the country, and carrying out operational research to test new and lower cost approaches will increase the speed at which WASH can be distributed to the regions of Indonesia (Press, 2023).

By comparing some of the strategies that the Philippines have incorporated, it is clear that more of an emphasis should be placed on the management of raw water resources. On the PSWSSMP reform agenda, strengthening the regulatory environment and balancing water supply and demand is considered a main priority for this country (Angeles, 2022). Indonesia should work to develop a more comprehensive Water Safety Plan in order to ensure the delivery of safe water to households throughout the entire supply network and incorporate future demands for water use. Indonesia is working to include a risk-management analysis of the upstream catchment area of the raw water source, which can improve the quality of water at the community level (Roma & Jeffrey, 2010). Ensuring that the treatment of raw water sources is being monitored is essential to increase the efficacy of WASH programs.

Recommendations for Future

The country should continue to use the three programs identified in this policy analysis, but in order to increase the effectiveness, improvements should be made to each program. The microfinance programmes would have to implement a more effective enforcement policy to make sure that the money was being directed to its original purpose. Rather than blindly offering loans, as has been done in the past, having some form of support for building strong and lasting infrastructure would make this programme more effective and would ensure that the effects of the programme were long-lasting. The education programme would need to be better funded and the teachers would have to receive an extended amount of training in order to better influence the behaviours of their students. More efforts would need to be made to integrate the school community with the wider community in order to enact change on a broader scale. The STBM programme would have to incorporate better communication and collaboration between local and national governments. This was the main obstacle for this programme, and could be alleviated by providing an increased level of funding on both accounts, with the local government in particular being educated on the urgentness of WASH

systems in order to prioritise funding for improvement in this sector. The division of labor and organisational responsibilities for the STBM capacity building program need to be further delineated among different units in the Ministry of Health in order to ensure quality implementation ("Scaling Up Rural Sanitation Building Rural Sanitation Capacity," 2016).

The country should also consider different programs to ensure that marginalized and vulnerable households in both the urban and rural areas have an inclusive WASH provision. These programs may come in the form of incentive-based programs and micro-credits, as well as subsidies, free connection fees, and zakat (Muslim charity fund) (Satriani et. al, 2022). Scaling up and leveraging the zakat fund for WASH by strengthening the government's collaboration with National Zakat Agency and other authorised zakat collection organisations could provide a unique opportunity to improve sanitation and hygiene systems within the country.

The most obvious recommendation to improve WASH coverage in Indonesia is to increase funds in this sector. Currently, most of the funds for improving WASH systems come from banks and the central government, but utilizing climate finance budgets as a potential source for financing the WASH sector could also help to inject money into this sector. Leveraging the help of more multilateral development banks could also help to increase the overall budget directed towards sanitation and hygiene programs. Other ways to provide sustainable and innovative financing sources could be to increase local financial capacity through reasonable tax and/or tariff mechanisms. Moreover, it is recommended that Indonesia works to strengthen their partnerships with various stakeholders, including the private sector for service delivery and resource mobilisation.

This funding should be used for nationwide implementation of sanitation programs, which includes an increase in the number of employees working in this sector. In 2014, 30% of the 9,599 community health centers in the 34 provinces of Indonesia did not have any sanitarians employed. Based on governmental calculations, an estimated additional 12,000 sanitation professionals are needed to empower community members and provide technical expertise at a level that would meet the country's sanitation goals. The government should work to employ more sanitarians in rural areas in order to increase the efficacy of systems such as the STBM program.

In addition, taking into account how these WASH systems can be structured to reduce levels of inequality is also important in creating an equitable society. Microfinance programmes typically offer loans primarily to women as they are more likely to use the funds to help their family. This is an important step to placing women at the forefront of sanitation and hygiene access in the country, which can potentially reduce gender inequality relating to menstrual health, maternal

health, and gender impacts. Having programs in the educational system that focus on gender in relation to sanitation can increase the educational level that females reach in this country.

By increasing funding, taking into account equitable solutions, and prioritising WASH systems in Indonesia, the country will be able to improve health outcomes for its population by reducing rates of child stunting, premature deaths, and fecal-oral disease as well as improving the economic outlooks of much of its population. The issue of sanitation and hygiene is a pressing concern not only in Indonesia but worldwide. In March 2023, the United Nations announced that they would be hosting the first water conference in 50 years, with attendees pushing to treat water as a common good rather than a tradeable commodity (Jerving, 2023). The conference aims to adopt a Water Action Agenda, which will provide clear guidelines for the water sector in the future. In the last two decades, much effort has been put into improving sanitation outcomes, but this progress can be potentially accelerated by implementing the recommendations outlined in this policy analysis.

Glossary

IUWASH - Urban Resilient Water, Sanitation, and Hygiene Actiivty programme sponsored by USAID to achieve higher quality levels of sanitation and hygiene in urban areas; in Indonesia, this was a 40 million dollar five-year long effort between 2011 to 2016

ODF - open defecation free, used to describe communities that have shifted to using toilets instead of open defecation

STBM - Sanitasi Total Berbasis Masyarakat, a community-led sanitation programme in Indoensia that seeks to ensure open-defecation free communities, handwashing, household water treatment and safe storage of water and food, solid waste management, and liquid waste management. This intervention promotes a highly decentralised approach, which has resulted in an uneven distribution of sanitation facilities across the country

WASH - water, sanitation, and hygiene; type of systems that refer to strategies to provide safe drinking water, sanitation, and hygiene to improve human health and well-being in communities

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