8th INTERNATIONAL CONFERENCE OF ZAKAT PROCEEDINGS
ISSN: 2655-6251

Exploration of Zakat as a Supportive Instrument for Water Distribution Access: an Implementation Analysis in Indonesia

Nurherlina[1], Fitriani[2], Tita Novita Sari[3], Tika Widiastuti[4]
Faculty of Economics and Business, Universitas Airlangga, Surabaya, Indonesia[1,2,3,4]

Paper was presented at the 8th International Conference of Zakat (ICONZ)
17 - 19 December 2024, Bandung, Indonesia

ABSTRACT

Water is a vital human need, the most important health initiative in the world, and one of the key factors in urban-rural socio-economic development. This research aims to analyze whether zakat collection has the potential to support the achievement of the Sustainable Development Goals (SDGs) regarding household distribution and access to basic services across 34 provinces in the years 2019-2023. We use simple regression to analyze the strength of the relationship, predict values, identify patterns, and calculate coefficients using the EViews 12 tool. Zakat collection has a significant impact on providing household access to drinking water, access to household sources of drinking water from pumps, and access to household sources of drinking water from both protected and unprotected springs. Meanwhile, zakat collection does not have a significant impact on household access to piped drinking water. The implications of this research for achieving equitable zakat distribution suggest that the government, along with stakeholders in each province, needs to build social safety net mechanisms through collaboration with government institutions in the social sector.

Keywords: *Zakat Collection, Basic Water Services, Social Safety Net*

INTRODUCTION

Water is a vital and irreplaceable commodity (Eneng et al., 2018). The goal of Sustainable Development Goals (SDGs) point 6 is to "Ensure availability and sustainable management of water and sanitation for all." Access to quality, clean water is a global challenge that remains a primary focus of UNESCO. They discussed this issue during the joint forum from May 18-24, 2024, in Bali, under the theme "Water for Shared Prosperity." This forum also aims to promote international partnerships as solutions to these problems. These efforts arise because water storage and distribution have not kept pace with the global population growth. Helping communities access safe water is one of the most important concerns in the health sector worldwide.

The condition of contaminated water quality and water management in America has been an urgent issue and a concern for public policymakers for years (Silva-Rodríguez de San Miguel, 2018). This issue is responsible for approximately 1.5 million deaths annually, including around 60% of global infant deaths due to diarrheal diseases, primarily caused by

No	Variable	Coefficient Variance	Uncentered VIF	Centered VIF
1	X □ Y1	1.155085	125.0063	1.000000
2	X □ Y2	0.304268	125.0063	1.000000
3	X □ Y3	0.393050	125.0062	1.000000
4	X □ Y4	0.411697	125.0063	1.000000
5	X □ Y5	0.154871	125.0063	1.000000

unsafe water quality, inadequate sanitation, and poor hygiene (Yue et al., 2017). The intensity of drought and water scarcity is also evident in California, which has implemented various water conservation measures (El-Khattabi, 2023). Louise Manning (2008) research reveals that the number of people living in areas with insufficient clean water will increase from 1995 to 2025, and by 2030, projections indicate that two-thirds of the world's population in Africa and Asia will face moderate to severe water scarcity.

According to the 2022 climate change report from the Intergovernmental Panel on Climate Change (IPCC), droughts have caused about 34% of deaths between 1970 and 2019 (McCordic et al., 2023). The Organisation for Economic Co-operation and Development (OECD) responded to these various challenges by focusing its sustainable programs in 2006 on a project that aimed to evolve infrastructure in the transportation and water sectors, telecommunications, and energy needs in OECD countries and BRIC nations (Brazil, India, and China) over the next 20 years. The development of these three components by 2030 will impact water resilience, economic development, public health, and food availability (Cashman & Ashley, 2008; Manning, 2008). According to a 2011 study by Ozcan Saritas & Liliana Proskuryakova (2017) experts from the International Water and Sanitation Center, the water sector operates within a dynamic environmental context, which significantly influences economic development levels, demographic changes, and governance arrangements.

Indonesia is one of the countries implementing integrated water resource management as a model for water management; regional drinking water companies (PDAM) provide water facilities to meet the needs of the community. Research by Suminar et al (2021) indicates that the service coverage of PDAM is still relatively low due to various constraints, primarily related to institutional factors, budget, technology, and community involvement. Wibowo and Alfen (2015) explain that PDAM has collaborated with small and large-scale private investors through public-private partnerships and business-to-business models; however, this collaboration represents only a small portion of the clean water service provision in each region. Data from the Central Statistics Agency (BPS) of Indonesia in 2023 shows that the percentage of households with access to drinking water services is quite low at 44.95 percent, with households accessing piped drinking water at 8.92 percent and households accessing pump drinking water at 17.7 percent. Additionally, access to household drinking water sources from protected wells is at 15.26 percent.

Akka Habib (2022) and Ai Yue (2017) clarify the importance of drinking water distribution as a vital human need, a crucial health initiative worldwide, and a key factor in urban-rural socio-economic

development. Providing sustainable water services certainly requires collaboration between institutions and the community to create strategic plans, policies, and governance (Kasri et al., 2017). Furthermore, the need for substantial investment funding significantly and positively influences institutional cooperation in increasing the availability of drinking water across regions (Nohong, 2018).

The condition emphasizes the scarcity of access to water and how Islamic economics defines it. According to Amir Wahbalbari et al (2015), scarcity is one way to better understand Islamic economics. Islamic economics centers on addressing economic issues and investments from an Islamic perspective, while maintaining individual freedom, fostering economic growth, and advancing the socio-economic well-being of citizens through social finance mechanisms such as zakat, waqf, almsgiving, and infaq, among others (Shinkafi et al., 2017). Previous studies have looked at how social finance, mostly zakat, affects things like hunger, sustainable agriculture, quality education, health and well-being, clean water, and sanitation (SDGs points 2, 3, 4, and 6). The results show that zakat helps poor communities get access to health care and education, money for businesses that make things, money for everyday needs, and clean water and good sanitation. Thus, zakat is believed to help achieve many sustainable development goals (Abduh, 2019; Abdullah et al., 2015; Ascarya, 2022; Dirie et al., 2023; Ibrahim Atah et al., 2018; Miah, 2021; Tok et al., 2022). Various countries, such as Indonesia, Qatar, Kuwait, Bangladesh, Iran, Oman, Egypt, and Iraq, have established public institutions specifically for the collection and distribution of zakat (Nusrate Aziz & Mohamad, 2016).

Indonesia established the National Zakat Agency (BAZNAS) as the zakat management institution through Presidential Decree Number 07/PRIN/10/1968 and Presidential Decree Number 8 of 2001 concerning the establishment of BAZNAS. However, the overall management of zakat funds still needs to be improved, particularly in meeting clean water needs. This has become the responsibility of the state to distribute the collected funds to important sectors that enhance community welfare, including the fulfillment of water needs (Faiz, 2023; Herianingrum et al., 2024). This study aims to explore the potential of zakat as a supportive instrument in improving access to clean water distribution in Indonesia. While the literature has long recognized zakat as an Islamic social finance instrument beneficial for reducing poverty and assisting vulnerable groups, its utilization as a tool for supporting clean water distribution has received less attention. There have been previous studies related to the role of zakat in access to water, including (Amalia et al., 2020), (Muhammad et al., 2023), (Atah et al., 2024), (Fauzia & Rosifah, 2021), (Yulinar, 2021), (Hudaefi et al., 2020). However, these studies tend to focus on the general aspects of zakat's role without investigating in-depth the influence of zakat on specific water access indicators used by the Central Statistics Agency (BPS). These indicators include drinking water sources, such as piped water, water from pumps, water from protected springs, and unprotected springs, as well as broader access to drinking water services. Therefore, the literature still needs more clarity on how zakat can directly influence access to these drinking water sources, especially when considering data measured by BPS.

LITERATURE REVIEW

Theories and Concepts of Zakat and its Role in Achieving the SDGs

Linguistically, zakat means "to purify" or "to cleanse," implying that paying zakat can free the hearts of the payers from greed and selfishness and enhance the blessings of the wealth that has been zakat-ed. Terminologically, zakat is defined as a portion of wealth that a Muslim is obligated to give for the benefit of the eight categories of recipients (asnaf) mentioned in the Qur'an (Kahf & Al Yafai, 2015). Zakat differs from charity (ṣadaqah), which is voluntary, as zakat is a mandated obligation. Besides being a duty for Muslims, zakat plays a crucial role in enhancing the welfare of society (Herianingrum et al., 2024).

Zakat can reduce both economic and social disparities because it distributes wealth in a way that does not concentrate solely on the wealthy but also benefits the poor. According to Monzer Kahf, in addition to being a duty for Muslims, zakat serves as a tool for wealth redistribution that can correct economic imbalances and provide a social safety net for the poor and vulnerable (Kahf, 2002). Zakat can improve access for people with low incomes to education, health care, capital, and other resources needed to enhance their quality of life. Thus, zakat funds have significant potential to support sustainable development, particularly in creating a more prosperous and equitable society.

The role of zakat in relation to the sustainable development goals (SDGs) is crucial to understanding the current global context. Zakat in Indonesia plays an important role in supporting the achievement of the SDGs (Yulinar, 2021). Zakat can significantly contribute to the achievement of the SDGs, particularly those related to poverty alleviation (SDG 1), reduction of inequalities (SDG 10), and access to clean water and sanitation (SDG 6) (Noorbiah & Najahudin, 2022). By utilizing zakat to support projects aimed at improving access to clean water and sanitation, it can become part of the solution to the clean water crisis affecting many countries, including Indonesia. Various emerging literature indicates that Zakat has great potential to support the Sustainable Development Agenda through targeted and sustainable fund utilization.

The Need and Access to Clean Water Distribution in Indonesia

Data from the Central Bureau of Statistics (BPS) indicates that in 2022, the national average percentage of household access to clean water was 44.94%, while in 2023 it rose to 44.95% (BPS, 2024a). Although some regions, such as Central Java, East Java, and Lampung, show relatively stable access that is higher than the national average, many other areas still lag, especially in Eastern Indonesia. This highlights that the gap in access to clean water in Indonesia remains significant, and the average increase in access to clean water has yet to be substantial.

Access to clean water in Indonesia urgently needs improvement, as clean water is a vital support for human survival and is essential for economic, social, and health functions (Exposto et al., 2021). Therefore, stronger and more equitable efforts are required to enhance access to clean water across all provinces in Indonesia.Various challenges hinder the distribution of clean water in Indonesia. These challenges include not only physical barriers, such as difficult geographic locations, but also financial and social obstacles (Herawati et al., 2021). Inadequate infrastructure for the management and distribution of clean water in rural areas is one of the main barriers to meeting water needs. Therefore, the government requires alternative funding sources, such as Zakat funds, to assist in

constructing adequate infrastructure to enhance clean water access in Indonesia.

In the context of water distribution analysis, variables related to access and sources of drinking water play a crucial role in measuring the availability and quality of water services for households. The percentage of access to drinking water services reflects the proportion of the population that has access to safe drinking water, whether from piped networks or other sources. Meanwhile, the proportion of households with piped drinking water sources indicates the central distribution of clean water through more formal and secure infrastructure. On the other hand, the percentage of households using water from pumps reflects dependence on groundwater sources, which may have implications for the sustainability of water resources in the long term. Sources of drinking water from springs are also significant, where the percentage of households using protected and unprotected springs provides insight into the quality of the water obtained, with protected springs being more reliable for reducing contamination risks. Overall, these variables are essential for understanding disparities in water access across different regions, as well as the role of Zakat as a social financial instrument in supporting more equitable and quality access (BPS, 2024b).

Based on a series of theories and previous research used in this study, the researcher formulates the following hypotheses:

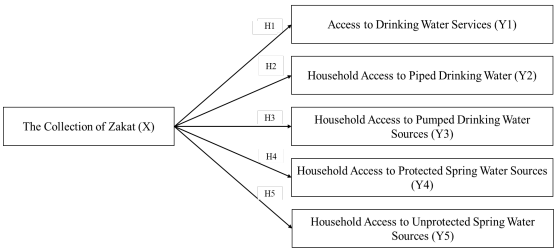


Figure 1. Research Framework

Source: Authors (2024)

METHODOLOGY

This study employs a quantitative method using secondary data, specifically reports issued by the government, which include (1) Zakat collection data from 34 provinces; (2) percentage of households with piped drinking water, water from pumps, protected spring water, and unprotected spring water by province; and (3) percentage of access to drinking water services by province. The National Zakat Agency (BAZNAS) and the Central Bureau of Statistics of Indonesia published annual reports from 2019 to 2023, providing a total of 170 observations for the data. The dependent variables in this study are the percentage of access to drinking water services (Y1), percentage of households with piped drinking water sources (Y2), percentage of households with pump water sources (Y3), percentage of households with protected spring water sources (Y4), and percentage of households with unprotected spring water sources (Y5). The independent variable is the distribution of Zakat for clean water assistance.

We conducted data processing using Eviews 12 for Students software and panel data regression analysis to determine the equations and impacts of each dependent variable on the distribution of Zakat for Clean Water Assistance. The equations in this study are mapped as follows:

$$\mathbf{Y = \alpha + \beta \cdot X} \quad \text{or} \quad \mathbf{Y = \alpha + \beta \cdot Zakat}$$

Explanation:

Y = Percentage of Access to Drinking Water Services (Y1); Percentage of Households with Piped Drinking Water Sources (Y2); Percentage of Households with Pump Water Sources (Y3); Percentage of Households with Protected Spring Water Sources (Y4); and Percentage of

Households with Unprotected Spring Water Sources (Y5).

Zakat = Distribution of Zakat for Clean Water Assistance

α = Intercept (constant)

β = Slope

The simple regression equation above illustrates the relationship between the distribution of Zakat for clean water assistance and access to drinking water services, as well as the various types of drinking water sources used by households. Based on this equation, an appropriate estimation model can be mapped out, followed by classical assumption testing, model estimation, and hypothesis testing. We will then represent the supporting theories, draw conclusions, and propose recommendations.

RESULT

Analysis of Research Results

Based on the statistical data analysis, the Zakat collection data was sourced from the National Zakat Collection Agency (BAZNAS) Indonesia. In contrast, the data on household access to essential water distribution services was obtained from the Indonesian Central Bureau of Statistics (BPS). Subsequently, the following model selection tests were conducted:

Table 1. Selection Test Model

No	Variable	Chow Test (Cross Section F)	Hausman Test (chi-square)	LM Test (Breusch-Pagan)	Best Model
1	The Impact of Zakat Collection on Access to Drinking Water Services	3.644002 (0.0142)	8.993206 (0.0027)	-	FEM
2	The Impact of Zakat Collection on Household Access to Piped Water Sources	4.548068 (0.0050)	0.980413 (0.3221)	6.872652 (0.0088)	REM
3	The Impact of Zakat Collection on Household Access to Pump Water Sources	1.547747 (0.2144)	-	-	CEM
4	The Impact of Zakat Collection on Household Access to Protected Spring Water Sources	5.899271 (0.0012)	0.147289 (0.7011)	11.99419 6 (0.0005)	REM
5	The Impact of Zakat Collection on Household Access to Unprotected Spring Water Sources	2.580279 (0.0540)	0.795792 (0.3724)	1.900661 (0.1680)	REM

Source: Processed Data, EViews V.12 (2024)

The model selection process was based on a series of analytical tests. First, the Chow Test was conducted. If the probability value of the Cross-Section F result is less than 0.05, the Fixed Effect Model (FEM) is more appropriate to use compared to the Common Effect Model

(CEM). However, if the Cross-Section F-value is greater than 0.05, the Common Effect Model (CEM) is deemed the most appropriate and optimal model. Second, the Hausman Test was used if FEM was selected in the Chow Test. If the chi-square value is less than 0.05, the FEM is more suitable compared to the Random Effect Model (REM). Conversely, if the chi-square value is greater than 0.05, the REM is a better fit. The Lagrange Multiplier Test was employed if REM was selected in the Hausman Test. If the probability value of the Cross-Section F is less than 0.05, the REM is more appropriate than the CEM.

Based on the data from Table 2, the model selection test conducted on 34 provinces in Indonesia illustrates the following results: the analysis of the impact of zakat collection on access to drinking water services revealed that the Fixed Effect Model (FEM) was selected, as the test results yielded a value less than 0.05. Furthermore, the analysis of the effect of zakat collection on household access to piped water sources, protected spring water sources, and unprotected spring water sources resulted in the Random Effect Model (REM) being chosen, as the results were more significant than 0.05. Lastly, for analyzing the effect of zakat collection on household access to pump water sources, the Common Effect Model (CEM) was selected, as the test results produced a value greater than 0.05. In the next step, the heteroscedasticity test results were reviewed, providing the following outcomes:

Table 2. Heteroscedasticity Test

No	Variable	Prob. Chi-Square (1)
1	X □ Y1	0.0593
2	X □ Y2	0.2859
3	X □ Y3	0.9322
4	X □ Y4	0.0716
5	X □ Y5	0.2684

Source: Processed Data, EViews V.12(2024)

Based on the data in Table 3, the analysis focused on the Glejser test. If the probability value obtained from the significance level between the independent variables and the absolute residuals is more significant than 0.05, it indicates no heteroscedasticity issue. However, if the test result is less than 0.05, it suggests the presence of heteroscedasticity in the regression model (Priyatno, 2022). The heteroscedasticity test results concluded that the impact of zakat collection on access to drinking water services, household access to piped water sources, pump water sources, and both protected and unprotected spring water sources all yielded probability values greater than 0.05, indicating no heteroscedasticity issues.

The next test conducted was the autocorrelation test, which was assessed using one of the following models: the Durbin-Watson approach, the Q Box-Pierce Test, or the Breusch-Godfrey Test. In this study, the researcher utilized the Durbin-Watson method to evaluate the autocorrelation in the data. The Durbin-Watson (DW) test statistic did not fall within the critical range of the lower and upper bounds of the DW table, thus indicating no autocorrelation issue (Rifkhan, 2023). The results of the autocorrelation analysis are as follows:

Table 3. Autocorrelation Test

No	Analysis Model	Durbin-Watson
1	X □ Y1	1.978869
2	X □ Y2	2.006886
3	X □ Y3	1.909853
4	X □ Y4	1.834889
5	X □ Y5	1.960458

Source: Processed Data, EViews V.12(2024)

The autocorrelation test analysis using the Durbin-Watson statistic indicates that if the value is equal to or close to 2, the model is free from autocorrelation. If the

DW value is significantly lower than 2, it suggests the presence of positive autocorrelation. Conversely, if the DW value is significantly higher than 2, with a maximum value of 4, it indicates negative autocorrelation (Firdaus, 2018). In this study, the Durbin-Watson values for the autocorrelation test across all variables assessing the impact of ZIS collection on household access to drinking water services, piped water sources, pump water sources, protected spring water sources, and unprotected spring water sources were found to be approximately 2. This result confirms that all variable analysis models are free from autocorrelation issues.

The subsequent statistical test was the multicollinearity test, which evaluated whether the regression model was free from solid correlations among independent variables. The following multicollinearity test was performed:

Table 4. Multicollinearity Test

No	Variable	Coefficient Variance	Uncentered VIF	Centered VIF
1	X □ Y1	1.155085	125.0063	1.000000
2	X □ Y2	0.304268	125.0063	1.000000
3	X □ Y3	0.393050	125.0062	1.000000
4	X □ Y4	0.411697	125.0063	1.000000
5	X □ Y5	0.154871	125.0063	1.000000

Source: Processed Data, EViews V.12 (2024)

Multicollinearity issues can be detected using the centred variance inflation factor (VIF). If the VIF value exceeds 10, it indicates multicollinearity issues. Conversely, if the VIF value is below 10, there is no evidence of multicollinearity (Rifkhan, 2023). Based on the statistical data presented in Table 4, the analysis of the effect of zakat collection on access to drinking water services, household access to piped water sources, pump water sources, and both protected and unprotected spring water sources revealed that the Centered VIF values are 1, meaning they are well below 10. This confirms that there are no multicollinearity issues in the model.

In the next section, the researcher conducted a regression analysis to determine whether there is any influence of the independent variables on the dependent variables, both partially and simultaneously, using the T-test (hypothesis test), F-test (simultaneous test), and the Coefficient of Determination test as follows:

Table 5. Simple Regression Analysis

No	Variable	Coefficient	T-statistic	F-statistic	Probability	Adjusted R-Square
1	X □ Y1	1.520022	1.521539	3.390929	0.3737	0.330958
2	X □ Y2	0.544028	0.424459	0.180292	0.6745	-0.029088
3	X □ Y3	-0.774317	-0.504062	0.254078	0.6182	-0.026401
4	X □ Y4	1.773964	2.649654	7.241189	0.0131	0.177099
5	X □ Y5	-0.087923	-0.213987	0.045790	0.8321	-0.034023

Source: Processed Data, EViews V.12 (2024)

Based on the regression test results using the T-test (hypothesis test), F-test (simultaneous), and Coefficient of Determination Test, the following explanation was obtained:

Analysis of the Effect of Zakat Collection on Household Access to Drinking Water

The Fixed Effects Model (FEM) was selected as the most appropriate for this study after analyzing data from 34 Indonesian province. The T-statistic value for the zakat collection was 1.521539, below the t-table value of 1.977826. The

F-statistic value was 3.390929, surpassing the F-table value of 2.283931. The probability (p-value) was 0.3779, which exceeds the 0.05 significance threshold. These results suggest that zakat collection has a simultaneous effect on household access to drinking water services, but the effect is not substantial when examined individually. The adjusted R-squared value of 0.330958 indicates that zakat collection accounts for 33.10% of the variance in household access to drinking water services during the study period.

Zakat Collection and Household Access to Piped Drinking Water Sources

The FEM was also chosen to assess household access to piped drinking water in the same 34 provinces. The T-statistic for the zakat collection was 0.424459, which is lower than the t-table value of 1.977826, and the F-statistic was 0.180292, below the f-table value of 2.283931. With a p-value of 0.6745, greater than 0.05, the results indicate that zakat collection does not have a significant effect, either partially or simultaneously, on household access to piped drinking water. The adjusted R-squared value of -0.029088 reflects a negative contribution, indicating that zakat collection during this period had an estimated impact of -2.91% on access to piped water sources.

Zakat Collection and Household Access to Pump Water Sources

The Common Effects Model (CEM) was the best model for analyzing the relationship between zakat collection and household access to pump water across the 34 provinces. The T-statistic for zakat collection was -0.504062, lower than the t-table value of 1.977826, and the F-statistic was 0.254078, falling short of the f-table value of 2.283931. The p-value was 0.6182, higher than the 0.05 threshold, indicating that zakat collection does not have a significant partial or simultaneous effect on access to pump water sources. The adjusted R-squared value of -0.026401 suggests that zakat collection had a minimal and negative impact (-2.64%) on access to pump water sources during the study period.

Zakat Collection and Household Access to Protected Spring Water Sources

The Random Effects Model (REM) was selected as the most appropriate for this analysis. The T-statistic for the zakat collection was 2.649654, exceeding the t-table value of 1.977826, and the F-statistic was 7.241189, surpassing the f-table value of 2.283931. The p-value was 0.0131, which is lower than the 0.05 threshold. These results indicate that zakat collection has a significant partial and simultaneous effect on household access to protected spring water sources. The adjusted R-squared value of 0.177099 reveals that zakat collection accounted for 17.71% of the variance in household access to protected spring water during the study period.

Zakat Collection and Household Access to Unprotected Spring Water Sources

Finally, the REM was also utilized to examine household access to unprotected spring water sources. The T-statistic for zakat collection was -0.213987, lower than the t-table value of 1.977826, and the F-statistic was 0.045790, below the f-table value of 2.283931. The p-value was 0.8321, indicating that zakat collection has no significant partial or simultaneous effect on household access to unprotected spring water sources. The adjusted R-squared value of -0.034023 suggests that zakat collection negatively impacted access to unprotected spring water sources by -3.40% during the study period.

The findings highlight the varying influence of zakat collection on household

access to different water sources. While zakat collection significantly improves access to protected spring water, it does not harm access to piped water, pump water, or unprotected spring water sources. Based on the analysis above, zakat collection has a significant partial and simultaneous effect on household access to protected spring water sources, as well as a significant simultaneous effect on household access to adequate drinking water. This suggests that zakat, as a wealth redistribution mechanism, empowers communities by improving the availability of protected spring water resources. These findings align with the research of Jumardi et al., (2023), which demonstrated that zakat funds can be allocated for clean water infrastructure projects, thereby increasing community access to safe drinking water.

Access to clean drinking water is essential for public health, as proper sanitation and clean water supply are closely intertwined (Permana et al., 2023). However, zakat collection does not have a significant effect on household access to piped water, pump water, or unprotected spring water sources. This may be attributed to the fact that Zakat Management Institutions have not specifically targeted these water sources. According to available data, BAZNAS primarily allocates zakat to broadly address the water crisis in Indonesia (see Table 5). Furthermore, the type of drinking water access a household has can be indicative of their economic status, which is also influenced by factors such as the educational attainment of the household head and poverty level (Putri & Yuniasih, 2022; Suprianti & Hendro, 2023). Consequently, zakat-funded programs focused on education and poverty alleviation may indirectly contribute to enhanced access to clean water.

Therefore, zakat collection funds should be allocated to initiatives supporting access to adequate clean water (Mauludin & Herianingrum, 2022). These programs should target all types of water sources within the community, including protected spring water, piped water, pump water, and unprotected spring water sources. Through effective management, zakat funds can be utilized to develop improved clean water infrastructure, ultimately increasing public access to safe and sufficient drinking water supplies.

DISCUSSION

We conducted further processing based on the analysis results from the data collection phase, which included Zakat collection and community access to clean water services sourced from BAZNAS and BPS RI. This included model selection tests, heteroscedasticity tests, autocorrelation tests, multicollinearity tests, and regression tests (T-test, F-test, and determination analysis). The findings indicate that the Zakat collection has a significant impact on providing households with access to drinking water, household pump water sources, and both protected and unprotected spring water sources. Additionally, another finding from this research is that Zakat collection has a small effect on household access to piped drinking water sources.

While the National Zakat Agency distributed Zakat to address Indonesia's water crisis, the following can be said:

Table 6. The Distribution of Zakat in Relation to the Water Crisis in Indonesia

Year	Month	Type of Assistance	Province	Number of Beneficiaries	Budget Realization
2022	July	Clean Water Facilit	West Java (Sumed	95	Rp12.429.200

		y	ang)		
	August	Bore Well	West Java (Kuningan)	1779	Rp71.222.568
		Pipanasi	Central Java (Magelang)	800	Rp30.386.500
	November	Bore Well	West Java (Cianjur)	208	Rp16.881.500
		Permanent Latrine			Rp16.881.500
	December	Bore Well	North Sumatera (Tanjung Balai)	133	Rp25.039.000
2023	September	Clean Water Distribution	Banten (Lebak)	4620	Rp169.742.600
			West Java (Bogor)	4019	
			DKI Jakarta	3675	
	October		Banten (Serang)	1663	
			West Java (Sukabumi)	4312	
			Banten (South Tangerang)	1549	
			Banten (Tangerang)	931	
			DKI Jakarta (Cengkareng)	2200	
			South Sulawesi (Jeneponto)	571	
			West Java (Bekasi)	12.452	
			West Java (Purwakarta)	1.314	
			North Maluku (Ternate)	60	
			West Java (Ciamis)	670	

Source: BAZNAS RI (2024)

Based on the application of Zakat distribution by BAZNAS RI in 2022 and 2023, the aim is to address community access difficulties related to drought while also supporting the livelihoods of those classified under the poverty line. Overall, the distribution results primarily focus on Java, underscoring the necessity for a comprehensive review of conditions across all 34 provinces in Indonesia. Umer Chapra articulates that the theory of development should adhere to the application of Maqasid Syariah, and the "Vision of Development in the Light of Maqasid Syariah" provides a refreshing perspective for improvement. In addition to collecting public funds in the form of taxes and Zakat or other forms of social funding across all regions, the government should also implement distribution justice that impacts all citizens in every area (Jiang & Jin, 2024). Additionally, strengthening the distribution and utilization of Zakat from BAZNAS significantly supports the achievement of the SDGs related to health, clean water, and sanitation (Yulinar, 2021).

The solution to the clean water crisis, which continues to affect regions

across the 34 provinces, is based on findings from a review of data from the Central Bureau of Statistics 2024 and this study, which reveals that Zakat collection has a strong correlation/influence on several analyzed variables. Therefore, to help achieve equitable distribution of Zakat collection in line with SDGs related to health and clean water distribution, stakeholders in each province need to establish a social safety net mechanism, as implemented since the time of the Prophet Muhammad (SAW).

Sumodiningrat (1999) outlines four priority points in Indonesia, one of which is social protection. This goal is to maintain community access to basic services, particularly health and education, by identifying individuals, identifying causes, allocating resources, and identifying assistance. Furthermore, in practical activities, research by Kasri (2017) and Mursalim Nohong (2018) reveals that sustainable water services require significant and positive institutional cooperation to promote the equitable distribution of water across regions. Therefore, to address water crisis issues, we have developed a model that integrates a social safety net:

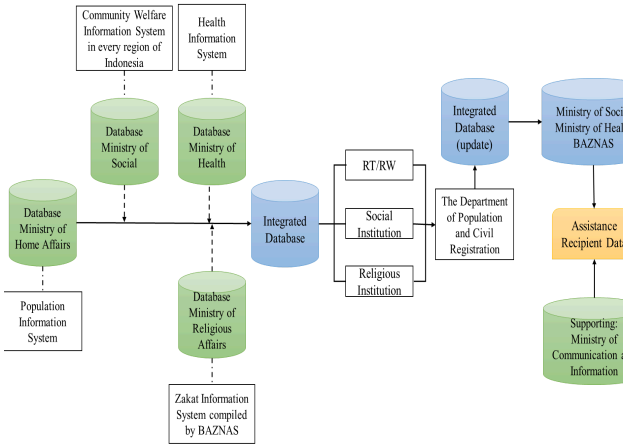


Figure 2. The Integrated Social Safety Net Model For the Clean Water Crisis

Source: Tika Widiastuti (2024)

Based on the integrated model presented above, the goal is to establish collaborative efforts among social institutions to track beneficiaries who have and have not received assistance. This includes monitoring communities or areas experiencing a clean water crisis, which requires immediate intervention from the nearest social institutions, such as the Ministry of Social Affairs, the Ministry of Finance, and the Ministry of Health. These institutions actively collaborate with BAZNAS, an organization present in even the smallest and most remote areas. The framework of Maqasid Syariah, which is beneficial for identifying community issues related to basic needs (ad-dharuriyatul khams), presents the application of this model as a solution for both short-term and long-term use, aiming for a more comprehensive and sustainable resolution of issues, particularly those concerning health and the distribution of clean water.

CONCLUSION

Based on the research analysis, it was found that Zakat collection significantly impacts household access to drinking water sources, such as water from pumps, protected springs, and unprotected springs. This finding indicates that Zakat can play a crucial role in providing households in Indonesia with access to clean water. However, the research also shows that Zakat collection does not have a significant simultaneous effect on household access to piped water sources.

BAZNAS's Zakat distribution during 2022 and 2023 reveals dominance of allocations in the Java region, underscoring the need for a more equitable distribution across all 34 provinces in Indonesia. This aligns with Umer Chapra's belief in the importance of fair distribution, which is in line with the principles of Maqasid Sharia, which aim to

ensure that all citizens benefit from Zakat, including access to clean water and sanitation. This research also emphasizes that the Zakat collection has the potential to support the achievement of the Sustainable Development Goals (SDGs) related to clean water and sanitation provision. To achieve equitable Zakat distribution, the government, along with stakeholders in each province, needs to establish a social safety net mechanism. This study proposes an integration model that fosters collaboration between social institutions and BAZNAS to tackle the clean water crisis more effectively and sustainably, based on the principles of Maqasid Sharia.

REFERENCES

Abduh, M. (2019). The Role of Islamic Social Finance in Achieving SDG Number 2: End Hunger, Achieve Food Security and Improved Nutrition and Promote Sustainable Agriculture. *Al-Shajarah*, *2019*(Special Issue Islamic Banking and Finance 2019), 185–206.

Abdullah, N., Derus, A. M., & Al-Malkawi, H. A. N. (2015). The Effectiveness of Zakat in Alleviating Poverty and Inequalities a Measurement using a Newly Developed Technique. *Humanomics*, *31*(3), 314–329.

Amalia, R. Y., Nurwahidin, N., & Huda, N. (2020). Strategi Lembaga Amil Zakat dalam Meningkatkan Akses Sanitasi dan Air Bersih (Studi Kasus LAZ Harfa Serang). *ZISWAF J Zakat Dan Wakaf*, *7*(1), 33.

Ascarya, A. (2022). The Role of Islamic Social Finance During Covid-19 Pandemic in Indonesia's Economic recovery. *International Journal of Islamic and Middle Eastern Finance and Management*, *15*(2), 386–405. https://doi.org/10.1108/IMEFM-07-2020-0351

Atah, U. I., Rufaâ, S. A., Habib, S. B., & Abba, S. A. (2024). Exploring Faith-based Economic Model (Zakat) for Ensuring Sustainability of Clean Water Provision and Sanitation in Nigeria: A Lesson from Indonesia. *International Journal of Research and Innovation in Social Science*, *8*(6), 1343–1354.

BPS. (2024a). *Distribusi Persentase Rumah Tangga Menurut Provinsi dan Sumber Air Minum, 2023*. https://www.bps.go.id/id/statistics-table/3/YzBaMlduSlFVbTVrUnpWeU9YRTJka0pVTTFkU1FUMDkjMw==/distribusi-persentase-rumah-tangga-menurut-provinsi-dan-sumber-air-minum.html?year=2023

BPS. (2024b). *Proporsi rumah tangga dengan akses terhadap pelayanan dasar menurut provinsi (Persen), 2022-2023*. https://www.bps.go.id/id/statistics-table/2/MjAxNiMy/proporsi-rumah-tangga-dengan-akses-terhadap-pelayanan-dasar-menurut-provinsi--persen-.html

Cashman, A., & Ashley, R. (2008). Costing The Long-Term Demand For Water Sector Infrastructure. *Foresight*, *10*(3), 9–26.

Dirie, K. A., Alam, M. M., & Maamor, S. (2023). Islamic social finance for achieving sustainable development goals: a systematic literature review and future research agenda. *International Journal of Ethics and Systems*.

El-Khattabi, A. R. (2023). Social Opprobrium and Compliance: Evidence from Water Conservation. *Water Resources and Economics*, *42*(February), 100218. h18

Eneng, R., Lulofs, K., & Asdak, C. (2018). Towards a Water Balanced Utilization Through Circular Economy.

Management Research Review, *41*(5), 572–585.

Faiz, I. A. (2023). Critical Perspective on Public Deficits: Contrasting Conventional and Islamic Views. *Journal of Islamic Accounting and Business Research*.

Fauzia, A. S., & Rosifah, S. N. (2021). Zakat Funding Solution In Community-Led Total Sanitation (CLTS) Approach For Clean Water And Proper Sanitation In Banten, Indonesia. *AZKA International Journal of Zakat & Social Finance*, 49–69.

Habib, A., Bouchaib, B., & Housni, S. (2022). A Critical Analysis of Water Economics in Public Water and Sanitation Services in Morocco. *Arab Gulf Journal of Scientific Research*, *40*(3), 280–301.

Herawati, H., Kartini, Akbar, A. A., & Abdurrahman, T. (2021). Strategy for realizing regional rural water security on tropical peatland. *Water*, *13*(18), 2455.

Herianingrum, S., Supriani, I., Sukmana, R., Effendie, E., Widiastuti, T., Fauzi, Q., & Shofawati, A. (2024). Zakat as an instrument of poverty reduction in Indonesia. *Journal of Islamic Accounting and Business Research*, *15*(4), 643–660.

Hudaefi, F. A., Saoqi, A. A. Y., Farchatunnisa, H., & Junari, U. L. (2020). Zakat and SDG 6: A case study of Baznas, Indonesia. *Journal of Islamic Monetary Economics and Finance*, *6*(4), 919–934.

Ibrahim Atah, U., Mohammed Ali Nasr, W., & Omar Mohammed, M. (2018). The Role of Zakat as an Islamic Social Finance Towards Achieving Sustainable Development Goals: A Case Study of Northern Nigeria. *Global Conference on Islamic Economics and Finance*, *October*, 83–98.

Jiang, C., & Jin, B. (2024). Does the Development of Digital Economy Infrastructure Reduce the Urban-Rural Income Gap? Theoretical Experience and Empirical Data from China. *Kybernetes*, *53*(2), 600–619.

Jumardi, Hadijah Wahid, S., Irawan, H., & Permata, S. (2023). Analisis Peran Unit Pengelola Zakat Berbasis Desa Sebagai Sarana Pemberdayaan Ekonomi Ummat. *Jurnal Adz-Dzahab: Jurnal Ekonomi Dan Bisnis Islam*, *8*(2), 180–198.

Kahf, M. (2002). Introduction to the study of the economics of zakah. *Economics of Zakah. Jeddah*, *Ix*, 31–32.

Kahf, M., & Al Yafai, S. (2015). Social security and zakāh in theory and practice. *International Journal of Economics, Management and Accounting*, *23*(2), 189–215.

Kasri, R. Y., Wirutomo, P., Kusnoputranto, H., & Moersidik, S. S. (2017). Citizen Engagement to Sustaining Community-Based Rural Water Supply in Indonesia. *International Journal of Development Issues*, *16*(3), 276–288.

Manning, L. (2008). The Impact of Water Quality and Availability on Food Production. *British Food Journal*, *110*(8), 762–780.

Mauludin, M. R., & Herianingrum, S. (2022). Pengaruh Digital Zakat Terhadap Penghimpunan Zakat Dan Kinerja Lembaga Amil Zakat. *Jurnal Ekonomi Syariah Teori Dan Terapan*, *9*(1), 47.

McCordic, C., Raimundo, I., Judyn, M., & Willis, D. (2023). The Distribution of Cyclone Idai's Water Impacts in Beira, Mozambique. *Disaster Prevention and Management: An International Journal*, *33*(6), 1–15.

Miah, M. A. (2021). Effectiveness of Zakat-Based Poverty Alleviation Program: Evidence from Bangladesh. *International Journal of Zakat*, *6*(2), 27–42.

Muhammad, A. A., Ardo, A. M., Hussaini, H. A., & Aminu, J. A. (2023). Relevance of Zakat and Waqf Models to Achieve Sustainable Development Goals of Water and Sanitation in North Eastern Nigeria. *Islamic Economics Journal*, *9*(2), 187–198.

Nohong, M. (2018). The Moderating Effect of Efficiency and Non-Market Capability in Relationship Between Government Involvement and Resources to Performance of Water Supply Companies (PDAM) in Sulawesi, Indonesia. *International Journal of Law and Management*, *60*(2), 402–412.

Noorbiah, M. R. S., & Najahudin, L. (2022). The Influence of Zakat and Taxes in Achieving the Sustainable Development Goals (SDG). *Global Journal Al Thaqafah*.

Nusrate Aziz, M., & Mohamad, O. Bin. (2016). Islamic Social Business to Alleviate Poverty and Social Inequality. *International Journal of Social Economics*, *43*(6), 573–592.

Permana, I., Firlianty, & Mentari, T. (2023). Gerakan Pencegahan Stunting Melalui Edukasi Pada Masyarakat. *Pengabdian Kampus : Jurnal Informasi Kegiatan Pengabdian Pada Masyarakat*, *10*(1), 65–69.

Priyatno, D. (2022). *Olah Data Sendiri Analisis Regresi Linier Dengan SPSS dan Analisis Regresi Data Panel Dengan EViews*. Yogyakarta: Cahaya Harapan.

Putri, M., & Yuniasih, A. F. (2022). Determinan Akses Sumber Air Minum Layak di Provinsi Bengkulu Tahun 2021. *Seminar Nasional Official Statistics*, *2022*(1), 155–164.

Rifkhan. (2023). *Pedoman Metodologi Penelitian data Panel dan Kuesioner*. Jawa Barat: Adanu Abimata.

Saritas, O., & Proskuryakova, L. N. (2017). Water Resources – an Analysis of Trends, Weak Signals and Wild Cards with Implications for Russia. *Foresight*, *19*(2), 152–173.

Shinkafi, A. A., Ali, N. A., & Choudhury, M. (2017). Contemporary Islamic Economic Studies on Maqasid Shari'ah: a Systematic Literature Review. *Humanomics*, *33*(3), 315–334.

Silva-Rodríguez de San Miguel, J. A. (2018). Water Management in Europe and Latin America. *Management of Environmental Quality: An International Journal*, *29*(2), 348–367.

Suminar, L., Werdiningtyas, R., & Kusumastuti. (2021). Investigating The Implementation of Indonesian Regulation in Drinking Water Supply System. *IOP Conference Series: Earth and Environmental Science*, *916*(1).

Sumodiningrat, G. (1999). Jaring Pengaman Sosial dan Pemberdayaan Masyarakat. *Jurnal Ekonomi Dan Bisnis Indonesia*, *14*(3), 138–139.

Suprianti, M., & Hendro, F. (2023). Program Sanitasi Total Berbasis Masyarakat (Stbm) Pilar Ketiga Pengolahan Air Minum Bersih. *Jurnal Pengabdian Kepada Masyarakat (NADIMAS)*, *2*(1), 13–19.

Tok, E., Yesuf, A. J., & Mohamed, A. (2022). Sustainable Development Goals and Islamic Social Finance: From Policy Divide to Policy Coherence and Convergence. *Sustainability*, *14*(11), 6875.

Wahbalbari, A., Bahari, Z., & Mohd-Zaharim, N. (2015). The Concept of Scarcity and Its Influence on the Definitions of Islamic Economics: A Critical Perspective.

Humanomics, 31(2), 134–159.

Wibowo, A., & Alfen, H. W. (2015). Benchmarking The Efficiencies of Indonesia's Municipal Water Utilities Using Stackelberg Data Envelopment Analysis. Benchmarking, 22(4), 588–609.

Yue, A., Shi, Y., Luo, R., Zhang, L., Johnson, N., Rozelle, S., & Zhao, Q. (2017). The Impact of Investment on Drinking Water Quality in Rural China. *China Agricultural Economic Review*, *9*(2), 255–269.

Yulinar, M. (2021). Pencapaian zakat terhadap sustainability development goals (SDGs) Di tiga desa Di kabupaten majalengka: Implementasi indeks BI-WAS. *Jurnal Ekonomi Syariah*, *6*(2), 64–77.