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BEYOND RELIEF: HOW ZAKAT-CSR PARTNERSHIPS BUILD RESILIENT WATER SAFETY NETS IN DROUGHT-PRONE COMMUNITIES

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ABSTRACT

Access to clean water remains a critical challenge in drought-prone karst regions, where conventional social protection mechanisms often fail to address structural vulnerabilities. This study analyzes how zakat-CSR collaboration builds community-based water safety nets through a borewell program in Ngadipiro Lor hamlet, Gunungkidul District, Indonesia. Using a revelatory case study approach, it examines the mechanisms, impacts, and sustainability of the partnership between BAZNAS and PT Askrindo's CSR in providing clean water infrastructure. Data were collected through in-depth interviews, field observations, and document analysis. Findings show that the program operates as transformative social protection by fulfilling the protective, preventive, promotive, and transformative functions of the TSP framework while strengthening community resilience across economic development, social capital, information and communication, and community competence. Seven sustainability factors were identified, including locally adapted technical design, affordable fees, accountable local institutions, ongoing mentorship, embedded social-religious values, multi-actor collaboration, and long-term community ownership. Overall, the study demonstrates that zakat-CSR partnerships can serve as effective transformative water safety nets that address immediate water shortages while building long-term resilience in drought-prone communities.

Keywords: *zakat–CSR, resilience, social protection, water systems, community governance*

I. INTRODUCTION

Access to clean water constitutes a foundation for achieving public health, economic productivity, and dignified quality of life. Although recognized as a human right by the UN General Assembly in 2010, the global water crisis remains a serious challenge threatening the achievement of Sustainable Development Goals (SDGs), particularly SDG 6 on clean water and sanitation (United Nations, 2015). UNDP (2023) reports that over 2.2 billion people worldwide still lack access to safe drinking water, while WHO (2019) emphasizes that water scarcity serves as a primary trigger for waterborne diseases that disproportionately affect poor and vulnerable populations. Consequently, clean water is not merely an ecological issue but a structural problem that reinforces poverty, widens gender inequality, and hinders sustainable development (Smiley, 2020).

Indonesia, despite possessing 6% of the world's freshwater reserves, faces a paradox of water availability that is both geographical and social in nature (WEPA in Wijaya et al., 2023). This challenge is most evident in karst areas such as Gunungkidul District, Special Region of Yogyakarta, where more than 70% of the territory consists of highly porous carbonate rock, making surface water retention difficult (Haryono & Day, 2004). These geological conditions cause drought to become a recurring and chronic disaster – a slow-onset disaster whose impacts accumulate over time

(Germanwatch, 2021). In 2023, the Gunungkidul Regional Disaster Management Agency reported distributing over 18 million liters of clean water solely to meet basic needs in 11 drought-affected villages (Kompas, 2023). While such emergency interventions are crucial for responding to short-term crises, this approach does not alter the structural vulnerabilities surrounding communities. The chronic nature of drought demands a social protection paradigm that is not merely reactive but transformative. Literature on adaptive social protection emphasizes the importance of protection systems capable of reducing risks, strengthening adaptive capacity, and building long-term resilience (Davies et al., 2009; Sabates-Wheeler & Devereux, 2007). This transformative approach transcends temporary aid distribution by focusing on productive asset development, strengthening local institutions, and structural changes that address the roots of vulnerability (Devereux & Sabates-Wheeler, 2007).

However, Indonesian government social safety net programs, such as the Family Hope Program (PKH) and other social assistance, remain constrained by fiscal capacity, targeting challenges, and intervention patterns that tend to be temporary and consumption-based (World Bank, 2020). Consequently, many communities in disaster-prone areas do not receive basic infrastructure investment that could structurally reduce their vulnerability to external shocks such as drought.

In the context of state limitations, the role of non-state actors – particularly zakat institutions and corporations through Corporate Social Responsibility (CSR) schemes – becomes increasingly strategic. Zakat holds significant financial potential with estimates reaching IDR 233.8 trillion annually, yet collection realization has only reached 3-4% of this potential (BAZNAS, 2021). Beyond being a financial mechanism, zakat functions as a value-based social safety net that not only provides material assistance but also strengthens social solidarity, distributive justice, and community empowerment rooted in Islamic values (Ahmed, 2004; Shirazi, 2014).

Meanwhile, corporate CSR possesses substantial funding capacity as well as technical and managerial support relevant for infrastructure investment (Porter & Kramer, 2011). However, CSR implementation in Indonesia often remains charity-based and poorly integrated with long-term community development needs (Rosser & Edwin, 2010). Collaboration between zakat institutions and CSR offers an intervention model that transcends mere charity, creating shared value through integrating the socio-religious legitimacy of zakat institutions with corporate financial and managerial strength (Achmad, 2022). This collaboration not only fills gaps in state social protection but also has potential to become a mechanism strengthening community resilience through long-term productive asset development.

Water infrastructure development – particularly borewells in karst areas – represents a tangible manifestation of such transformative collaboration. Water infrastructure not only addresses short-term access deficits but also generates multiplier effects on agricultural productivity, family health, educational participation, and women's empowerment (Hutton & Chase, 2016). However, water infrastructure development in karst regions requires substantial investment, local knowledge about hydrogeological conditions, and community-based governance to ensure infrastructure sustainability (Yustikasari & Lulofs, 2022).

The collaboration model in which zakat institutions serve as active managers and CSR partners act as funders creates an implementation ecosystem that is effective, participatory, and sustainability-oriented, yet understanding of its mechanisms, sustainability factors, and impacts on community resilience remains limited in the literature. Ngadipiro Lor hamlet in Semin Sub-district, Gunungkidul District, serves as both a representative and unique example of these dynamics. As an agrarian community facing chronic drought, Ngadipiro Lor was selected as an implementation site for a borewell program resulting from collaboration between the National Board of Zakat (BAZNAS) of the Republic of Indonesia and PT Askrindo (Persero) through a CSR scheme. The program not only provided water infrastructure but also established community-based water

management institutions that independently conduct maintenance, collect fees, and manage operational administration. This transformation not only meets short-term adaptation needs but potentially strengthens the ecological, social, and economic resilience of the community.

Several previous studies have confirmed that productive zakat has positive impacts on improving mustahik welfare, particularly in economic and social dimensions (Hidayat et al., 2019). A study by Asmadia et al. (2025) comparing zakat management systems in Indonesia and Malaysia found that although Indonesia has a strong legal framework through BAZNAS and LAZ, zakat collection remains limited due to inadequate infrastructure and uneven distribution. Research by Wasalmi (2024) shows that the effectiveness of zakat distribution heavily depends on institutional capacity, timely distribution systems, and government participation in creating supportive policies.

In the context of clean water provision, several recent studies demonstrate the strategic role of zakat in building basic infrastructure. UNHCR's Refugee Zakat Fund (2024) reports that nearly USD 22 million in zakat and charity funds have supported over 872,000 individuals in 25 countries, including clean water, sanitation, and hygiene (WASH) programs in conflict and disaster areas such as Yemen, Chad, and Lebanon. These programs not only provide emergency water access but also build sustainable infrastructure such as solar-powered water purification systems and Sadaqah Jariyah programs for long-term water solutions (UNHCR, 2024).

A study by Muslim Hands UK (2022) emphasizes that zakat-funded water projects must meet Shariah criteria, namely: (1) beneficiaries are poor and needy groups entitled to receive zakat, (2) water infrastructure ownership is fully transferred to the community, and (3) the program functions as sadaqah jariyah providing sustainable benefits. This research also found that zakat-based water projects in Yemen, Rwanda, and Bangladesh successfully increased clean water access for millions of people who previously spent up to 16 times the water value to obtain clean water (Muslim Hands UK, 2022).

In the Indonesian context, the role of Corporate Social Responsibility (CSR) in clean water provision becomes increasingly strategic amid rising pressure on water resources due to urbanization, climate change, and inter-regional access inequality. Silva's (2024) systematic review shows that CSR contributions primarily lie in water conservation, water stewardship, sustainable supply chains, and community education—four mechanisms highly relevant for Indonesia facing declining water quality, excessive groundwater extraction, and vulnerability in peri-urban and rural areas.

The corporate water responsibility management (WRM) framework outlined in the Journal of Business Ethics (2025) reinforces the urgency of holistic approaches by companies, including water risk assessment, local community engagement, and integration of ethical-environmental standards in industrial operations. This is important given that extractive, manufacturing, and agribusiness sectors in Indonesia are the largest water users with significant socio-environmental impacts.

The case study of collaboration between Amazon and Water.org in Indonesia demonstrates how CSR can move beyond philanthropy toward impact investment. Through microfinance and partnerships with Bandung District Water Company, this program has helped over 35,000 residents obtain piped water connections, reducing the burden of water collection time—especially for women—while improving family health and productivity. This model affirms CSR's potential in strengthening public infrastructure and reducing water access inequality in Indonesia.

Although existing literature highlights the important roles of zakat and CSR separately, research specifically examining their collaborative mechanisms in developing clean water infrastructure and their effects on community resilience remains very limited. Previous studies tend to treat zakat and CSR as separate entities and have not explored the potential synergy of their collaboration within adaptive social protection and resilience-building contexts. This research argues

that zakat–CSR collaboration in water infrastructure programs can function as a transformative social protection mechanism that not only addresses short-term access deficits but also strengthens long-term community resilience through enhanced social capital, economic empowerment, and stronger local institutions.

Based on the above context and research gap, this study formulates three main research questions:

a. How are community-based social safety nets constructed through zakat-CSR collaboration in the borewell program in Ngadipiro Lor hamlet?

b. What is the program's impact on community resilience in Ngadipiro Lor across dimensions of social capital, economic development, information and communication, and community competence?

c. What are the key elements that make the zakat-CSR collaboration model in Ngadipiro Lor sustainable and potentially replicable in other communities facing similar challenges?

II. LITERATURE REVIEW

Social protection in the past two decades has undergone a paradigm shift from conventional models oriented toward momentary assistance toward more transformative approaches. Devereux and Sabates-Wheeler (2004) assert that vulnerability does not merely arise from lack of assets or income but is also a product of social and political structures that create exclusion. Therefore, they developed the Transformative Social Protection (TSP) framework consisting of four functions: protective, preventive, promotive, and transformative, as follows:

a. The **protective** function refers to social protection interventions that provide direct relief to meet basic needs and prevent acute deprivation when individuals or communities experience shocks or crises. This is the most basic form of social protection that is reactive and short-term.

b. The **preventive** function refers to interventions designed to prevent deprivation before it occurs by strengthening the capacity of individuals or communities to manage risks and protect themselves from future shocks. This is proactive and oriented toward risk reduction.

c. The **promotive** function refers to interventions aimed at increasing real income, productive capacity, and community assets so they can escape poverty and achieve long-term economic mobility. This involves investment in human capabilities and productive assets.

d. The **transformative** function is the most ambitious in TSP, aiming to change the social, economic, and political structures that are the roots of vulnerability. This is not only about providing assistance or increasing assets but about changing power relations, discriminatory norms, and structural injustices that keep certain groups vulnerable.

The strength of this framework lies in its orientation not only to reduce risk impacts but also to transform social structures that cause risks to recur.

In alignment with this, studies on community resilience provide a complementary perspective on how communities respond and adapt to external pressures such as drought. Norris et al. (2008) define community resilience as a dynamic process connecting various adaptive capacities to achieve positive recovery after disruption. They identify four main capacities:

a. **Economic development** refers to the level of availability and diversity of economic resources in a community, as well as how these resources are distributed equitably. This concept emphasizes not only overall wealth accumulation but also equitable access and diversification of the economic base supporting community sustainability.

b. **Social capital** refers to networks of social relations, reciprocal norms, and trust that facilitate coordination and cooperation for mutual benefit. This is the "social glue" that binds communities and enables collective action.

c. **Information and communication** refers to systems and infrastructure facilitating the flow of accurate, timely, and reliable information throughout the community, as well as two-way communication between the community and external parties.

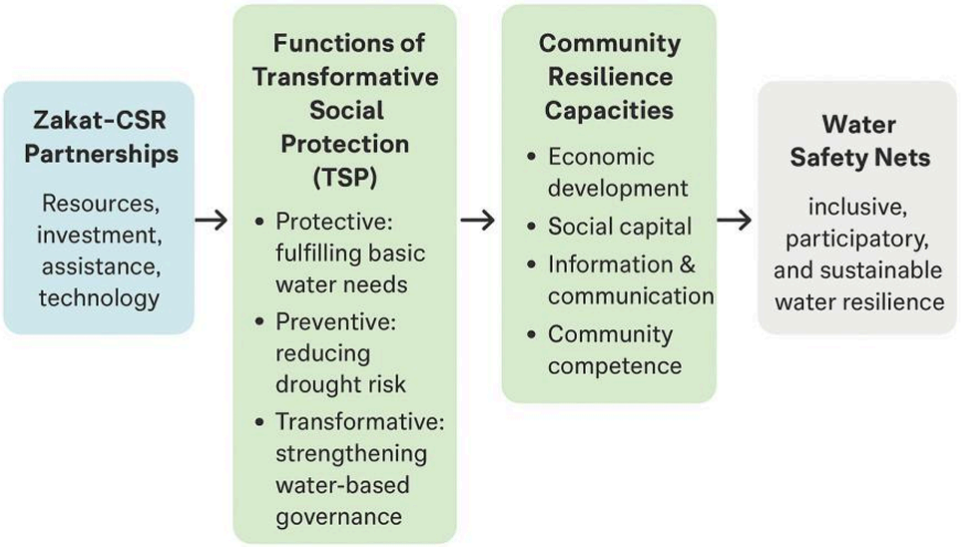
d. **Community competence** refers to the collective ability of communities to identify problems, reach consensus on solutions, plan and implement actions, and reflect and learn from experience.

These four capacities are interconnected, so strengthening one capacity can reinforce others; strong social capital enables better information flow and facilitates collective coordination in water resource management. This framework emphasizes that resilience is not merely the ability to return to the original condition (bounce back) but also to adapt and build new, more robust structures.

Magis (2010) subsequently expanded this understanding by positioning community resilience as one of the main dimensions of social sustainability. According to her, a sustainable community is one capable of maintaining adaptive capacity across generations through citizen participation, collective learning, livelihood diversification, self-organizing ability, and solidarity values. This perspective emphasizes the importance of community agency – that resilience is not only the result of external intervention but an internal process built through governance, values, and the community's own social structure.

To understand how zakat-CSR collaboration forms community-based social safety nets and strengthens community resilience to drought, this research uses a conceptual framework integrating the Transformative Social Protection (TSP) perspective with concepts of community resilience and community-based water governance. This framework is designed to map relationships between program interventions, community institutional formation processes, and transformation of community adaptive capacity, thereby generating comprehensive causal understanding of the success mechanisms and sustainability of this model.

Figure 1. Conceptual Framework



The integration of the TSP framework and community resilience provides a strong theoretical foundation for analyzing how zakat-CSR-based water programs function not only as emergency aid

but also as long-term development instruments. Through TSP, clean water interventions can be understood in terms of their functional roles – whether they protect, prevent risks, promote productivity, or transform social structures – while the community resilience framework clarifies the outcomes produced, such as increased social capital, strengthened community competence, improved information flow, or new economic opportunities. When combined, these frameworks offer a more complete causal understanding of how water infrastructure interventions can build sustainable water safety nets, where success is measured not merely by the physical presence of borewells but by how communities organize to manage, maintain, and distribute water equitably through strong local institutions, fair fee systems, community consultations, transparency, and technically capable water management groups. In drought-prone areas, such zakat-CSR collaboration holds significant potential to function as transformative social protection that advances sustainability, ecological resilience, and social justice simultaneously.

III. METHODOLOGY

This research employs case study methodology as a qualitative approach to understand social phenomena in real-life contexts in depth. The case study approach was chosen because it enables comprehensive exploration of "how" and "why" questions about phenomena that cannot be optimally reached through quantitative methods (Siregar & Murhayati, 2024). In this research, the case studied is the mechanism of zakat-CSR collaboration in borewell construction in Ngadipiro Lor hamlet and its impact on community resilience.

This research is designed as a single-case study with a revelatory case type (Yin, 2018). This design choice is based on the uniqueness of the Ngadipiro Lor case that opens new understanding about how zakat and CSR collaboration can build sustainable community-based social safety nets in drought-prone areas. This case study design considers flexibility in data collection strategies and the importance of triangulation to ensure finding validity (Siregar & Murhayati, 2024).

The unit of analysis in this research is the community social safety net mechanism formed through borewell program implementation, encompassing: (1) program implementation process, (2) Water Group governance, (3) community socio-economic changes, and (4) factors enabling program sustainability.

This research applies multiple sources of evidence to obtain rich and valid data, including:

a. In-depth Interviews. Semi-structured interviews were conducted with key informants consisting of the Water Group chairman and management, beneficiary residents, representatives from Gunungkidul District BAZNAS, BAZNAS RI, and PT Askrindo CSR representatives. The semi-structured interview technique was chosen to provide flexibility in exploring in-depth information while maintaining research focus.

b. Field Observation. Observations were conducted to understand geographical conditions, water infrastructure locations, water utilization practices, and daily management dynamics by the community. Participatory observation methods enabled researchers to obtain deeper contextual understanding of community social life.

c. Documentation Study. Documents analyzed included program reports, fee and group cash records, field photos, and government archives. This documentation was used as a triangulation source to strengthen data credibility and validity.

Data were analyzed using thematic coding techniques comprising three stages: (1) open coding to identify initial categories from raw data, (2) axial coding to connect these categories into broader themes, and (3) selective coding to compile core research findings (Strauss & Corbin, 1998). The analysis process was conducted with a pattern matching approach, matching empirical findings with the theoretical framework of Transformative Social Protection and Community Resilience

(Norris et al., 2008). This technique was used to identify causal relationships between borewell construction interventions and strengthening community adaptive capacity in facing drought-prone conditions.

To ensure research validity and reliability, researchers applied several strategies: (1) data source triangulation through combining interviews, observations, and documentation, (2) member checking by rechecking information with key informants, (3) chain of evidence by systematically documenting data collection and analysis trails, and (4) presenting thick description of context in depth to ensure finding transferability. With this rigorous methodological approach, the research can produce academically accountable and comprehensive understanding of how zakat-CSR collaboration builds community resilience through providing sustainable clean water access.

IV. RESULTS

The borewell construction program in Ngadipiro Lor hamlet, Rejosari Village, Semin Sub-district, represents one of the best intervention points from **PT Askrindo's CSR program in collaboration with BAZNAS** in providing clean water access. As one of the state-owned enterprises committed to sustainability and community empowerment aspects, PT Askrindo channeled its CSR support through building clean water facilities in drought-prone areas. Ngadipiro Lor hamlet then became one of the priority locations due to high water vulnerability levels, residents' dependence on an old non-functional well, and the high cost burden residents had to bear to meet daily water needs.

Conditions Before Assistance

Before receiving borewell construction assistance from the CSR program, the Ngadipiro Lor hamlet community faced significant clean water access limitations. The only borewell that served as the main source had suffered damage due to aging infrastructure and minimal maintenance, rendering it unable to produce water. Inadequate electrical infrastructure also meant that pump operations required high costs that were difficult for residents—who mostly had low incomes—to afford. When the well stopped functioning, residents were forced to rely on alternative sources such as fetching water from distant locations or purchasing water from tanker trucks, an expensive and unstable option that consumed substantial time, especially for women, the elderly, and other vulnerable groups.

These limitations directly affected the community’s socio-economic conditions. Most residents work as farmers and livestock breeders, meaning their water needs extended beyond household consumption to agricultural activities and livestock maintenance. Clean water shortages hindered crop irrigation, watering small agricultural plots, and maintaining the health and cleanliness of cattle and goat pens that serve as key income sources. During the dry season, these challenges intensified due to minimal water reserves, high evaporation, and reduced natural water sources, forcing residents to incur additional expenses for tanker water or travel farther to obtain water.

Efforts by the village government to find solutions included geoelectric surveys showing potential water sources at a depth of approximately 130 meters. However, limited village budgets and the community’s low financial capacity hindered drilling efforts. With 125 households and growing water needs for both daily consumption and livelihood activities, Ngadipiro Lor was highly vulnerable and urgently required decent, affordable, and sustainable clean water provision. Recognizing this complexity, the hamlet was designated as a priority area for the borewell construction program supported by PT Askrindo’s CSR in collaboration with BAZNAS. The intervention addressed not only technical needs but also strategic goals of improving welfare, strengthening economic resilience, and supporting the sustainability of rural livelihoods.

Program Implementation

The borewell construction in Ngadipiro Lor hamlet implemented by BAZNAS through PT Askrindo CSR support demonstrates excellent implementation quality from both technical and community benefit perspectives. The drilling process was conducted to 120 meters depth to ensure adequate and stable water source presence. Interestingly, consumable clean water sources were actually found at 44 meters depth, making water extraction more efficient and not requiring excessive energy. To optimize water storage and distribution, the originally planned 2000-liter tank capacity was increased to 5000 liters. This adjustment was made after considering the relatively high number of beneficiaries, community daily water needs, and estimated usage load during the dry season. This tank capacity increase decision proved appropriate, as it could guarantee water availability for all residents especially during peak demand hours.

Figure 2. Clean Water Well in Ngadipiro Lor Hamlet

Figure 3. Clean Water Tank in Ngadipiro Lor Hamlet

The well and tank placement was done on higher ground than residential settlements, so water distribution could utilize gravity and reduce dependence on additional pumps. This strategy not only reduced operational costs but also increased distribution reliability, particularly when electrical disruptions or machine pressure drops occurred. The construction process proceeded smoothly

without significant technical obstacles, thanks to good coordination between the implementation team and local community. After construction completion, the system could be immediately operated by residents. Installation of an electrical panel integrated with the pump machine facilitated tank filling without requiring exhausting manual intervention. However, the change from manual to automatic systems caused water extraction activity documentation to be unable to be done visually, as the community now receives water directly from household pipe networks.

Field observation results show that water quality from 44 meters depth is in good category. The water appears clear, odorless, and causes no health or aesthetic complaints from residents. This water can be used for various daily needs, from consumption and cooking to washing, bathing, and supporting economic activities such as irrigating chili plants, legumes, and maintaining cattle that serve as the community's main livelihood. This finding becomes an important point because several other CSR borewell points face water clarity problems or certain mineral content disturbing usage quality. Thus, the borewell in Ngadipiro Lor hamlet can be categorized as one of the most technically successful intervention points, while providing reliable water supply meeting community domestic and productive needs standards.

Program Management and Sustainability

The borewell program in Ngadipiro Lor hamlet demonstrates best practices in community-based water management, marked by the formation of a Water Group consisting of 15 members functioning as the main management institution after the well infrastructure began operating. This group has a strategic role in ensuring clean water service sustainability through a series of tasks, from regulating water distribution to all households, conducting machine and pipe network maintenance and care, to managing all well operational financial aspects.

To ensure financial sustainability, residents are charged IDR 4,000 per cubic meter plus a burden fee of IDR 4,000 per month. Average water consumption ranges from 3-16 cubic meters per household, generating bills of IDR 15,000 to IDR 80,000 per month—amounts far more affordable than local PDAM rates. Collected funds are allocated to cover electricity costs, pump machine maintenance, pipe repairs, and other operational needs, so the well financing structure can operate independently without dependence on external assistance. As work incentives, management members are given free water usage compensation of 5 m^3 per month, simultaneously reducing their household expenditure burden.

Beyond operational management, the Water Group has also successfully built financial stability through forming community cash funds. At evaluation time, this group had savings of IDR 6,500,000 stored and collectively managed. These funds are utilized for various needs such as infrastructure repairs, emergency situation handling, and supporting certain social activities in the hamlet. The group cash existence not only reflects good financial governance but also shows residents' trust level in the management institution they formed themselves, serving as an important indicator of program sustainability.

From the social governance side, the Water Group holds regular meetings every 35 days as a deliberation mechanism to evaluate fund usage, resolve technical constraints, and plan future system development needs. These periodic meetings play an important role in building transparency, strengthening social capital, and ensuring all decisions regarding water management are made participatorily and accountably. Through inclusive governance, developing technical capacity, and independent financial systems, Ngadipiro Lor hamlet successfully demonstrates how water infrastructure intervention can develop into a sustainable community resilience model.

Program Generated Impacts

The borewell program in Ngadipiro Lor hamlet provides very real impacts on community life, in both social and economic dimensions. Socially, residents' access to clean water increased significantly because water can now flow directly to homes through pipeline networks utilizing gravity. This reduces the physical burden on the community, especially women and elderly people, who previously had to walk quite far to fetch water from wells or natural water sources.

Besides increasing comfort and time efficiency, this change also encourages domestic and productive activities to become easier to do. Community-based water management has also strengthened sense of ownership and inter-resident solidarity. Through Water Group formation and joint management systems, residents participate in maintaining infrastructure, making decisions, and solving problems collectively. Regular meetings every 35 days conducted by the management group create healthy deliberation spaces and strengthen social communication, so water governance proceeds transparently, participatorily, and accountably.

From the economic side, this program generates significant cost efficiency for households. Water usage rates established by the group are far cheaper than purchasing tanker water or subscribing to PDAM, thus reducing residents' monthly expenditure burden. The continuously growing group cash existence also increases community financial resilience toward urgent needs, such as installation repairs or certain social needs, without having to depend on outside support. Besides consumption needs, stable clean water availability also encourages productive economic activities such as chili farming, legumes, and cattle breeding.

This support for agriculture and livestock sectors directly impacts family income increases and expands business spaces previously hindered by water availability. Incentives in the form of five cubic meters free water supply for management members not only serve as appreciation for their contributions but also reduce their own household expenditure burden. Overall, the integration between social and economic impacts shows that the borewell program not only provides clean water but also strengthens community resilience and opens sustainable welfare improvement opportunities.

BAZNAS Gunungkidul District's Role as Program Implementer

Besides funding support from PT Askrindo and program coordination from BAZNAS RI, the borewell implementation success in Ngadipiro Lor hamlet cannot be separated from the strategic role of Gunungkidul District BAZNAS as a local actor understanding social, geographical, and village institutional contexts. District BAZNAS serves as a bridge between central implementation teams and communities, from needs identification stages, location verification, to facilitating permits at sub-district and village levels. Their involvement is important in ensuring borewell point selection matches karst region hydrogeological characteristics and minimizes technical failure risks during the drilling process.

During the construction stage, Gunungkidul District BAZNAS not only served as technical supervisor but also as main companion ensuring all processes proceeded according to quality standards set by central BAZNAS. They conducted periodic field monitoring to oversee drilling processes, pipe installation installation, to electrical panel integration, so every construction stage could be accounted for technically and administratively. District BAZNAS presence in the field has strategic value because with deep understanding of Gunungkidul's karst-characterized geographical conditions, they can provide technical input regarding appropriate drilling points, drilling failure risks, and potential field adjustment needs that cannot be anticipated by central implementation teams.

After the well operated, Gunungkidul District BAZNAS's role became increasingly significant, especially in the Water Group institutional formation and strengthening phase. They not only facilitated group formation deliberations but also provided administrative assistance regarding

fee regulation preparation, financial recording mechanisms, management task distribution, to simple operational standard preparation that can be understood by all community members. This mentoring is important because it ensures physically built infrastructure can truly be managed by communities independently and sustainably.

Furthermore, district BAZNAS consistently provides guidance, education, and supervision to the Water Group regarding sustainable water management principles. They emphasize the importance of financial transparency, disciplined usage and fee recording, deliberation mechanisms to solve problems, and long-term planning for machine maintenance, pipe repairs, and reserve fund accumulation. This mentoring is not occasional but conducted repeatedly and structurally to ensure groups truly have capacity in maintaining service sustainability.

This approach plays a major role in strengthening community capacity from organizational and communication aspects. Water Groups become more capable of managing conflicts, preparing repair plans, and making collective decisions involving residents. District BAZNAS also serves as a bridge between communities and central BAZNAS, so if there are technical constraints or special needs, communication can proceed faster and more targeted. Thus, post-program sustainability does not occur naturally but is the result of systematic district BAZNAS intervention continuously strengthening local capacity and encouraging creation of inclusive, transparent, and accountable water governance. This role becomes a key factor making the borewell program in Ngadipiro Lor hamlet not only successful at implementation stage but also develop into a sustainability practice model that can be replicated in various other drought-prone locations.

V. DISCUSSION

Empirical findings from the borewell program in Ngadipiro Lor hamlet reveal dynamics of how zakat-CSR collaboration can function as a transformative social protection mechanism that not only restores vulnerable community conditions but also builds adaptive and sustainable collective resilience. The following discussion integrates three main aspects that simultaneously answer research problem formulations: mechanisms for building community-based social safety nets, program impacts on community adaptive capacity, and key elements making this model sustainable and replicable in other drought-prone areas.

Mechanisms for Building Community-Based Social Safety Nets

The borewell program in Ngadipiro Lor demonstrates how clean water intervention can implement Transformative Social Protection (TSP) principles gradually from protective, preventive, promotive, to transformative. In the initial stage, the program replaced BPBD emergency water assistance schemes, thereby providing protective functions by ensuring minimum clean water needs remain fulfilled. Unlike temporary emergency response assistance, borewell infrastructure construction shifts the program from a charitable approach toward long-term solutions.

The preventive function appears through technical borewell design built based on deep understanding of Gunungkidul karst conditions. Drilling to 120 meters, finding stable water sources at 44 meters, increasing tank capacity to 5,000 liters, and placing tanks on high ground utilizing gravity demonstrate structural recurring drought risk mitigation efforts. This approach reduces residents' dependence on tanker water or unpredictable seasonal sources.

The promotive function is evident from increased resident economic productivity. Stable water access enables agricultural and livestock business diversification and significantly reduces household water costs. Time and energy savings especially for women open greater opportunities for other productive activities.

The most significant transformation lies in the transformative function. Water Group formation, fee systems, community cash of IDR 6,500,000, routine deliberations, and management incentives reflect water governance transformation from a system dependent on outside parties to democratic and accountable community-based water management. Justice, solidarity, and participation values brought by zakat strengthen legitimacy and resident participation in managing water resources collectively.

The zakat-CSR collaboration role is very determining in this process. PT Askrindo's CSR provides large infrastructure investment, while BAZNAS, especially Gunungkidul District BAZNAS, fills managerial, social, and institutional spaces. Three mentoring phases by District BAZNAS—location verification, construction monitoring, and post-operational institutional strengthening—become the foundation enabling communities to move from passive aid recipients toward independent managers. This collaboration creates a social protection model that not only meets basic needs but also transforms community capacity structures in the long term.

Impact on Community Resilience: Mobilizing Adaptive Capacity

Research results show that the borewell program not only restores socio-economic functions (bounce back) but also encourages communities to achieve more advanced conditions than before intervention (bounce forward). This transformation is reflected in four main adaptive capacities. From the economic side, communities experience income increases and cost efficiency through agricultural intensification, livestock productivity, and household water cost savings. Stable water access also builds economic buffers through Water Group cash, functioning as independent recovery mechanisms for technical disruptions or urgent needs. All this strengthens economic resilience.

Community social capital is strengthened through mutual cooperation, deliberation, financial transparency, and incentive mechanisms reflecting communal values. Bonding, bridging, and linking social capital dimensions develop simultaneously because water management becomes a platform for cross-group interaction while strengthening community relationships with external actors such as BAZNAS and CSR. Strong social capital creates trust structures that become foundations for institutional stability.

In information and communication aspects, routine forums every 35 days become important deliberation arenas to discuss fund usage, technical constraints, water rates, and development plans. This information openness strengthens public trust and reduces conflict potential – issues that often emerge in common resource management. Informal communication systems using simple technology (e.g., WhatsApp) also accelerate coordination and information delivery.

Community competence is the most fundamental transformation. Communities are now capable of managing well operations, conducting machine maintenance, solving problems collectively, making deliberation-based decisions, and conducting reflective learning through routine evaluations. This success does not emerge spontaneously but is the result of intensive mentoring by Gunungkidul District BAZNAS that strengthens community technical, administrative, and social competence. This competence increase forms collective efficacy – a shared belief that communities are capable of managing critical resources independently. These four capacities mutually reinforce each other and create positive loops producing robust and adaptive community resilience. However, this synergy also signals that long-term sustainability depends on maintaining social capital, institutional transparency, and inter-management knowledge transfer.

Key Elements of Sustainability and Replicability

Overall analysis reveals seven main elements that make the zakat-CSR collaboration model sustainable and worthy of replication in other drought-prone areas, including the following:

1. **Locally-adapted borewell technical design** proves to be a determining factor in water infrastructure construction success in karst areas with high technical risks. Design adaptation to local geological conditions minimizes technical failures and ensures service sustainability.
2. **Fair and affordable water management fee-based financing schemes** enable operational systems to run independently without dependence on external support. Rate structures proportional to usage levels create sustainable financing mechanisms accepted by all residents.
3. **Democratic and accountable local institutions** become main pillars of sustainability. Regular meetings, cash transparency, and clear management structures prevent power concentration and strengthen participation.
4. **Continuous mentoring from Gunungkidul District BAZNAS** ensures community capacity continues developing in line with technical and institutional demands. This process builds community ability to manage infrastructure independently and responsively to various risks.
5. **Social-religious values inherent in zakat instruments** provide moral legitimacy that increases social cohesion and strengthens resident commitment in maintaining water management sustainability. These values serve as normative foundations for inclusive and just governance.
6. **Multi-actor collaboration with clear role division** produces effective coordination, reduces potential authority overlaps, and increases program implementation efficiency. Synergy among CSR, central BAZNAS, and district BAZNAS creates mutually complementary supporting ecosystems.
7. **Long-term orientation integrated in program design**, including strategies for transferring management to communities from the initial stage, enables service sustainability without dependence on donor institutions. This approach ensures communities have capacity to maintain and develop systems independently.

These seven elements show that program success does not only rest on technology or fund availability but also on social design, institutions, and values that form community resilience frameworks. The Ngadipiro Lor model affirms that zakat-CSR collaboration can become a form of transformative social protection that strengthens community ability not only to recover from crises but also to develop toward more resilient and adaptive conditions.

VI. CONCLUSION AND RECOMMENDATION

Overall, this study demonstrates that zakat–CSR collaboration can function as a transformative water safety net that not only addresses short-term clean water needs but also strengthens long-term community resilience. The Ngadipiro Lor model illustrates how context-appropriate technical design, transparent community governance, affordable tariff structures, and sustained mentoring from BAZNAS can convert emergency responses into sustainable, community-managed water systems. These findings affirm that such collaborations enable communities not only to recover from vulnerability but also to progress toward greater independence and adaptive capacity.

To enhance sustainability and broaden impact, this study recommends that the best practices from Ngadipiro Lor be adopted as a reference for philanthropic institutions in designing and implementing future borewell programs. Strengthening zakat–CSR coordination mechanisms, standardizing context-sensitive technical designs, institutionalizing accountable community governance, and replicating long-term mentoring models such as those used by BAZNAS are essential for scaling up. By adopting this approach, philanthropic organizations can ensure that clean water interventions go beyond providing basic services and instead promote empowerment, social cohesion, and long-term resilience in drought-prone communities.

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