Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 15 No. 2. Juni 2026 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

REVITALIZATION OF THE KALI GARANG WATERSHED: FROM FLASH FLOODS TO THE CONSTRUCTION OF THE JATIBARANG DAM, 1990–2015

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ARTICLE HISTORY
Received : 20-01-2026
Revised : 07-02-2026
Accepted : 25-05-2026

KEYWORDS
Flash Flood;
Revitalization;
Watershed;
Kali Garang;
Semarang;

ABSTRACT
During the late 20th century, Semarang experienced several devastating floods, most notably in 1973, 1988, and 1990. This recurrence prompted critical inquiries into the governmental and communal responses to such cyclical disasters. Utilizing an environmental history approach, this study examines the mitigation strategies implemented following the severe 1990 flash flood. The research employs historical methods by analyzing primary sources including contemporaneous documents and newspapers alongside relevant secondary literature. Findings reveal that revitalization programs in the severely impacted Kali Garang Watershed were executed incrementally. These interventions ranged from initial small-scale river normalization in late 1990 to the construction of the Jatibarang Dam, a National Strategic Project operationalized in 2015. However, rehabilitating the expansive watershed presented formidable challenges, necessitating complex coordination among stakeholders and communities directly exposed to the river's volatility. Ultimately, the study concludes that integrated watershed management is imperative for mitigating recurrent flooding in Semarang.

INTRODUCTION

Semarang has maintained an inextricable relationship with flooding, remaining chronically vulnerable to such disasters since the Dutch colonial era. To manage this complex hydrology, colonial authorities initiated various mitigation efforts, primarily by dredging rivers and constructing two major canals flanking the city's eastern and western corridors (Utama & Lusianto, 2020). The West Flood Canal (Banjir Kanal Barat), in particular, directly integrated with and accommodated the downstream flow of the Garang River. Beyond facilitating maritime trade, these infrastructures functioned essentially to drain upstream water discharge into the sea (Suliyati, 2014). This

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approach demonstrates the colonial government's adaptive water governance in response to Semarang's complex hydrology.

Despite various water management initiatives, historical records indicate that Semarang experienced several devastating floods during the second half of the 20th century, notably in 1973, 1988, and most severely in 1990. Flooding fundamentally occurs when a river's water volume surpasses its channel capacity, leading to the inundation of adjacent low-lying plains. This phenomenon can rapidly escalate into a flash flood when driven by brief, high-intensity rainfall that triggers a sudden and violent surge in river discharge (Indrayati et al., 2018). Pursuant to Law No. 24 of 2007, these recurring events are classified as disasters, as they demonstrably threaten public livelihoods and inflict substantial casualties, environmental degradation, economic losses, and psychological trauma. Among various flood typologies, the recurrent events in the Kali Garang Watershed predominantly qualify as flash floods due to their sudden and unpredictable nature (Widodo & Pasaribu, 2021). These conditions indicate the vulnerability of the drainage systems, including the dams and embankments situated along the Kali Garang Watershed.

To mitigate these persistent threats, the government initiated the revitalization of the Kali Garang Watershed. Drawing on Rukayah (2020), revitalization is conceptualized as a restorative effort aimed at reviving urban areas or districts that have experienced a functional decline in their socio-cultural and economic dimensions. This process utilizes both physical and non-physical interventions to accommodate contemporary needs and emerging challenges. Moving beyond mere technical infrastructure improvements, this systematic intervention integrates physical, economic, and socio-cultural dimensions to restore the area's vital functions (Kementerian PUPR, 2010). Consequently, this holistic approach serves as a long-term strategy to sustain the equilibrium among environmental integrity, economic viability, and community resilience.

The urgency for such comprehensive intervention peaked following the devastating 1990 flood, which establishes the temporal baseline for this research. This catastrophic event catalyzed profound environmental shifts and compelled both authorities and the public to critically reassess watershed management paradigms. Over the subsequent 25 years, policymakers executed various flood mitigation programs, culminating in the 2015 inauguration of the Jatibarang Dam in Gunungpati District (BBWS Pemali Juana, 2020). By examining this specific timeframe, the study captures the dynamic trajectory of environmental transformations, policy enactments, and socio-ecological responses to recurring disasters within the Kali Garang Watershed.

Spatially, this research centers on the Kali Garang Watershed, alongside portions of the Kripik and Kreo rivers, serving as a critical raw water reservoir for Semarang. Administratively, this cross-regency basin encompasses Semarang City, Semarang Regency, and Kendal Regency (Fatahilah, 2013). This watershed exhibits a profound vulnerability to flash floods, primarily driven by rapid population growth that escalates spatial and resource demands. Such anthropogenic pressures force erratic land-use conversions, severely depleting crucial water catchment areas (Fatahilah, 2013). These degraded ecological conditions, when coupled with intensified monsoon precipitation, synergistically precipitate catastrophic flash floods in the region (Widodo & Pasaribu, 2021). Therefore, this area was selected as the focal point of the study, as it represents the principal site of both the flash flood disasters and their subsequent mitigation measures.

Building upon the background of the Kali Garang Watershed, this research is grounded in a highly relevant theoretical framework. In their discussion on ecocentrism, Hudha et al. (2019) elucidate the profound interconnectedness between biotic components (specifically, humans) and abiotic elements (such as weather, topography, rivers, and the like). Ecocentrism emphasizes the mutualistic relationships among all constituent parts of an ecosystem. Within this theoretical construct, humans as rational and conscientious beings bear a moral obligation toward the environment. Consequently, this theory establishes ethical boundaries on human exploitation of nature, thereby ensuring the preservation of harmony between humanity and its surrounding environment.

This study's theoretical and analytical framework is grounded in several key literatures. Emalia (2023) highlights the relatively nascent state of environmental historiography in Indonesia, arguing that the historical dominance of political and economic themes has largely obscured the clear, systemic patterns of human-environment

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interactions. Consequently, her work provides an essential theoretical foundation for this article to comprehensively analyze these ecological dynamics.

Contextualizing the specific local event, Widodo and Pasaribu (2021) examine the Kali Garang Watershed flash flood by exploring the ecological dynamics of Semarang City. Their research demonstrates how the convergence of natural vulnerabilities and anthropogenic activities catalyzed the disaster. Furthermore, their analysis of the technical impacts and the collaborative socio-governmental emergency responses offers crucial background for understanding the impetus behind the subsequent watershed revitalization program.

Additional literature is also relevant to this study. These works discuss the process of government policy formulation, focusing on the bureaucratic systems and statutory regulations that served as the primary foundation for flood mitigation programs in Semarang, particularly from 1975 to 2000. Within this discussion, one of the implemented government policies was the maintenance of the Kali Garang Watershed, which included efforts such as river dredging and embankment construction. However, these maintenance programs are only explained in broad terms, lacking detailed accounts of the programs and their effectiveness (Desmond et al., 2015; Nurhayati & Subekti, 2022; Widyanti et al., 2014). Understanding the policy formulation process is essential to analyze the extent to which the enacted policies impacted the environmental conditions within the Kali Garang Watershed.

The aforementioned literature is relevant to the discussion in this article; however, a research gap inherently exists between those studies and this paper. This article examines the correlation between the impacts of the 1990 flash flood and the flood mitigation efforts taking the form of the Kali Garang Watershed revitalization program. This program was implemented in stages, starting from small-scale river normalization at the end of 1990 to the construction of the Jatibarang Dam National Strategic Project, which officially became operational in 2015. To date, a relatively limited number of environmental history studies explicitly explain the correlation between flood impacts and the Kali Garang Watershed revitalization programs.

The research problems addressed in this study are: (1) How did the 1990 flash flood disaster impact the environmental, social, and economic conditions of the Kali Garang Watershed? (2) What were the dynamics of the flood mitigation efforts and the revitalization of the Kali Garang Watershed? By examining these two aspects, this research seeks to provide an understanding of flood disaster patterns, the responses of the government and the community, and the extent to which watershed restructuring efforts have achieved sustainable environmental and socio-economic resilience.

METHOD

This research employs the historical method. According to Herlina (2020), historical research comprises four stages: (1) source collection (heuristics), (2) source criticism (internal and external), (3) interpretation, and (4) writing (historiography). This research topic was selected because relatively few environmental history studies explicitly explain the correlation between flood impacts and the Kali Garang Watershed revitalization program. Furthermore, this article is driven by the urgent need to break the recurring cycle of flood disasters in Semarang City.

In conducting historical research, data and facts are required as reference materials. This stage of tracing data and facts (sources) is termed heuristics. This research utilizes two types of sources: primary sources and secondary sources. The search for primary sources was conducted at several relevant institutions, including the Semarang City Archives and Library Office (Dinas Arsip dan Perpustakaan Kota Semarang), the Central Java Provincial Archives and Library Office (Dinas Kearsipan dan Perpustakaan Provinsi Jawa Tengah), and the Suara Merdeka Archive Depot. The primary sources utilized in this study encompass various newspapers, documents, photographs, and reports related to the 1990 flash flood event and the revitalization of the Kali Garang Watershed. Meanwhile, the search for secondary sources was carried out by accessing relevant prior literature, such as books, scientific articles, and reports, both online and offline.

The subsequent stage, source criticism, verifies the acquired historical materials through external and internal evaluations. External criticism assesses a document's authenticity and origins, whereas internal criticism evaluates its content's credibility and contextual reliability. To ensure data validity and mitigate bias, this study compares data

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derived from primary sources, such as newspapers and reports, against secondary sources, including books and relevant academic articles. Following this rigorous verification, the research proceeds to interpretation, which involves analyzing (deconstructing) and synthesizing (integrating) the validated data. The final stage is historiography, wherein these interpreted findings are reconstructed into a cohesive scholarly narrative. Grounded in this framework, the study examines the post-disaster impacts of the 1990 flash flood alongside corresponding mitigation efforts, spanning from the Kali Garang Watershed revitalization program to the 2015 inauguration of the Jatibarang Dam.

RESULT AND DISCUSSION

Impacts of the 1990 Flash Flood Disaster on the Environmental, Social, and Economic Conditions of the Kali Garang Watershed

Analyzing the multifaceted impacts of the 1990 flash flood is imperative to understand its direct correlation with the subsequent Kali Garang Watershed revitalization program. Consequently, this study evaluates the disaster's profound environmental, social, and economic effects on the affected communities.

Environmental Impacts

During the late 20th century, Semarang faced several high-discharge floods, culminating in the severe 1990 disaster. Ir. Bambang Soedjono of the Central Java Public Works Office classified this event as the most destructive on record (KARTIKA, 1990), a statement corroborated by Widodo and Pasaribu (2021) regarding its unprecedented impact on the Kali Garang Watershed. The flood severely compromised regional infrastructure and settlements, particularly affecting Sampangan, Bongsari, Puspanjolo, Banowati, and parts of West Semarang. Ultimately, the resulting infrastructural and material damages reached an estimated total of Rp8.5 billion (see Table 1).

Table 1. Infrastructure and Material Losses Resulting from the Flash Flood.

Type of Damage	Quantity/Size	Estimated Loss
Houses	782 units	Rp3.5 billion
Bridges	9 Units	Rp400 million
Roads	± 1 km	Rp300 million
Drainage channels and embankment structures	372 meters	Rp600 million
Office buildings (including elementary schools)	-	Rp1.4 billion
Livestock (cattle, goats, quails)	-	Rp5.7 million
Miscellaneous losses	-	Rp586.3 million
Total flood-induced losses		± Rp8.5 billion

Source: (Suara Merdeka, 1990)

These various impacts are inextricably linked to the dynamics of the mitigation and revitalization efforts within the Kali Garang Watershed. Notable recovery initiatives included the construction of new housing for displaced residents, the building of schools and embankments, alongside other supporting facilities. Indirectly, the cumulative losses stemming from this flood triggered a domino effect, presenting a distinct challenge for both the community and the government.

Sosioeconomic Impacts

Socioeconomic impacts served as a secondary or domino effect for the flood-stricken areas and their vicinities. However, these secondary effects were precisely what most profoundly influenced and disrupted the daily lives of the

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affected communities, often surpassing the direct impacts of the flood itself. The classification of these two domains (social and economic) is consolidated because they are closely intertwined.

The disaster exacted a catastrophic human toll, although historical records exhibit discrepancies regarding the exact number of casualties. Initial reports documented 77 fatalities, including 33 minors, predominantly from Gumuksari and Bongsari (KARTIKA, 1990). The high casualty rate in these areas was primarily attributed to their direct exposure to the Kali Garang, rendering them exceptionally vulnerable to the flood surges (Suara Merdeka, 1990). While dozens remained unaccounted for, alternative contemporary reports cited 87 deaths (Wawasan, 1990). These figures generally align with Widodo and Pasaribu (2021), which recorded 76 fatalities as of late January 1990; however, a significant data divergence appears in Harini and Wijayati (2025), which documented a much higher toll of 197 individuals.

Beyond residential devastation, the inundation severely crippled the local industrial sector. The Damaitex Textile Factory in Bongsari incurred an estimated Rp6 billion in material damages and suffered casualties among its night-shift workforce (KARTIKA, 1990). The resulting total paralysis of factory operations economically displaced approximately 500 workers, who were left merely to collect their meal allowances (Suara Merdeka, 1990). Ultimately, these profound socio-economic and spatial impacts catalyzed subsequent revitalization policies, most notably the strict prohibition of building construction along the Kali Garang riverbanks.

Figure 1. Damage to the Damaitex Factory Resulting from the Flood Surges (KARTIKA, 1990).

Exacerbating the crisis, post-disaster economic pressures catalyzed a surge in localized criminal activities. Opportunistic individuals exploited the compromised vigilance of residents and authorities to loot recently salvaged properties. To preempt further security breaches, law enforcement and recovery personnel collaboratively imposed strict curfews across vulnerable zones (Suara Merdeka, 1990). This social disruption corroborates the findings of Maftuhin and Kusumawardani (2022), which who demonstrate that natural disasters in Indonesia, including floods, typhoons, and forest fires, consistently precipitate secondary societal impacts by tangibly elevating crime rates within affected administrative jurisdictions. In stark contrast, Abe et al. (2014) highlight a fundamentally different pattern following the catastrophic 2011 Japan earthquake, revealing that post-disaster criminal activity remained exceptionally rare under similar vulnerable circumstances.

Alongside these socio-economic pressures, the disaster severely compromised critical public utilities, severing the electricity and clean water supplies essential for daily survival. The State Electricity Company (*Perusahaan Listrik Negara* or PLN), reported widespread network damage necessitating the replacement of 1,500 meters, which caused multi-day power outages that even affected unflooded neighborhoods like Krobokan in West Semarang (Suara Merdeka, 1990). Concurrently, clean water provisions were heavily disrupted, with Ir. Djaelani Saberan, President

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Director of the Regional Water Company (*Perusahaan Daerah Air Minum* or PDAM) in Semarang City, documenting municipal losses amounting to Rp120 million (Suara Merdeka, 1990). These concurrent public enterprise failures were fundamentally expected; as Suliyati (2014) asserts, the initial infrastructural development of PDAM pipelines and PLN electrical networks historically lacked proper coordination.

Furthermore, the disaster induced a temporary economic paralysis. Water overflows extending to Sudirman Street, specifically at the intersection leading to Recreation and Development Promotion Center (*Pusat Rekreasi dan Promosi Pembangunan* or PRPP), resulted in a near-total traffic gridlock along the Semarang-Kendal-Jakarta route from 01:00 to 09:00 WIB on Friday morning, January 26 (KARTIKA, 1990). This severe traffic stagnation consequently disrupted the economic circulation of the *Pantura* route (North Coast of Java).

The profound devastation wrought by the flood engendered widespread public disillusionment regarding the government's perceived ineptitude in managing the crisis. This frustration culminated in the circulation of anonymous clandestine leaflets criticizing local officials and law enforcement (Suara Merdeka, 1990). At the time, the government was still operating under the *Orde Baru* (New Order) regime, which notoriously repressed open dissent, these underground publications underscored the severe constraints on democratic freedom of expression. This phenomenon aligns with the discourse by Castillo and Silva (2025), which asserts that governmental environmental policies profoundly shape the reactive dynamics of the affected communities.

This flood event garnered serious attention from the central government, and even from International Committee of the Red Cross (ICRC) Jenewa, represented by Carl Naucher (KARTIKA, 1990). The Minister of Home Affairs, Rudini, conducted a direct inspection of the conditions in the affected areas. At the provincial level, Governor of Central Java, H. Muhammad Ismail, along with the ranks of the relevant agencies, also conducted field inspections and monitored the affected regions on a regular basis.

Dynamics of the Flood Disaster Mitigation Program and the Revitalization of the Kali Garang Watershed

The subsequent disaster mitigation and Kali Garang Watershed revitalization programs are inextricably linked to the 1990 crisis, as its profound socio-economic and environmental devastation catalyzed the demand for structured interventions. To systematically evaluate these measures, this analysis is bifurcated into short-term and long-term strategies, commencing with an examination of the immediate tactical responses collaboratively executed by the government and the affected communities.

Efforts to evacuate victims, establish evacuation tents, and provide first aid were carried out by the municipal government as disaster emergency response measures. In addition to healthcare interventions coordinated by Semarang City Health Department (*Dinas Kesehatan*), other medical personnel were also mobilized to assist the flood victims. Psychiatrists and traditional Chinese medicine practitioners (*sinshe*) were also involved in treating victims experiencing psychological distress, such as symptoms of stress and trauma resulting from the flood disaster (Suara Merdeka, 1990).

Figure 2. Conditions of Evacuation Tents for Flash Flood Victims (Suara Merdeka, 1990).

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The municipal and provincial governments, alongside volunteers, distributed logistical aid and medical supplies to meet the urgent needs of the victims. The Central Java Provincial Government handed over assistance to the Mayor of Semarang totaling Rp30 million (KARTIKA, 1990). To facilitate the coordination of flood disaster management, the ranks of the Armed Forces of the Republic of Indonesia (*Angkatan Bersenjata Republik Indonesia* or ABRI) at the municipal and provincial levels established six Task Forces. These six task forces encompassed the Security, Communication, Health, Logistics, Search and Rescue (SAR), and Rehabilitation Task Forces (KARTIKA, 1990).

Amidst the recovery efforts, stark communication disorientation between regional and central authorities generated significant institutional ambiguity. Specifically, a major polemic ensued when the Central Java Governor validated Kali Garang's riparian settlements present since the 1970s, effectively defying the Minister of Public Works' reprimand regarding the 50-meter safety zone violations (KARTIKA, 1990). This belated enforcement exposed chronic oversight negligence; the unhindered existence of these structures for two decades confirmed that the era's spatial planning policies were strictly reactive rather than preventive. Consequently, this governmental ambiguity drew significant contemporary public criticism (Surya, 1990). This finding is consistent with the discourse by Fatahilah (2013), which explains that the lack of cross-sectoral coordination in watershed management can culminate in communication disorientation among the relevant parties. This case demonstrates that the level of coordination among the agencies authorized for disaster mitigation remained relatively low.

In the disaster's aftermath, Governor H. Muhammad Ismail officially designated the downstream Kali Garang Watershed as a disaster-prone red zone. This mandate strictly prohibited subsequent industrial and residential redevelopment, aiming to restore the riparian areas as an unobstructed hydrological buffer (KARTIKA, 1990). Concurrently, the Central Java Public Works Agency (*Dinas Pekerjaan Umum* or PU) advanced physical revitalization efforts by allocating Rp50 million to structurally rehabilitate embankments at the most critical breach points (KARTIKA, 1990). These funds were prioritized for the structural repair of embankments at points most susceptible to breaching.

Furthermore, authorities executed mechanized dredging and river widening in the Gumuksari riparian zone of West Semarang (Priyanto & Nawiyanto, 2014). Concurrently, the revised spatial plan mandated the complete clearance of these hazardous riverside settlements. To accommodate the displaced population, the Semarang City Urban Planning Agency launched a Rp385 million relocation project in Sukorejo, Gunungpati, on February 4, 1990. Because permanent construction required substantial time, victims were initially housed in temporary shelters or *bedeng* (Suara Merdeka, 1990). Ultimately, the government transferred these finalized residential units to the victims free of charge as a demonstration of institutional accountability.

To contextualize the magnitude of these housing interventions, official assessments recorded a total of 1,042 affected residential units, 118 of which were swept away. Each victim with severe house damage was provided with Rp100.000 in assistance, while 117 slightly damaged houses each received Rp50.000 in aid. However, among this number, some did not receive direct financial assistance but were instead slated to be provided with new housing. A total of 321 Family Cards (*Kartu Keluarga* or KK) were registered to be allocated new housing (KARTIKA, 1990).

Complementing these state-led infrastructural interventions, post-disaster recovery was significantly bolstered by the active mobilization of civil society. By February 28, 1990, public donations had amassed Rp313.436.665, encompassing a specific Rp114 million allocation for educational reconstruction (KARTIKA, 1990). The Mayor of Semarang formally delegated the management of this school rehabilitation project to the Suara Merdeka daily. Consequently, the completely devastated Pegandan I and II Elementary Schools in South Semarang were rebuilt from the ground up, while other institutions received proportional renovations based on their damage severity. This finding accords with the study by Harini and Wijayati (2025), which posit that catastrophic flash floods not only stimulate structural mitigation but also profoundly catalyze public sympathy and social solidarity, temporarily overriding the inherent individualism typical of urban communities.

Toward the mid-to-late 1990s, a flood control channel project was implemented in the Tawang Mas Complex area, West Semarang. The flood control channel, spanning 900 meters in length and 16 meters in width, was completed

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by the end of 1990 (Suara Merdeka, 1990). The construction of the channel, bridges, and water gates, along with the land acquisition process, incurred a total budget of approximately Rp1.5 billion.

Furthermore, in 1992, the Semarang City Development Planning Agency (*Badan Perencanaan Pembangunan Daerah* or Bappeda) released a distribution map of inundated and flood-prone areas within the Kali Garang Watershed, indicating that the region's vulnerability to flooding remained significantly high. Through the map visualization, light-blue shaded areas represented zones threatened by 15-year return period floods, while dark-blue shaded areas indicated zones threatened by 5-year return period floods (see Figure 3). According to Widodo and Pasaribu (2021), this persistent susceptibility stemmed from massive upstream seasonal discharges, exacerbated by rapid demographic expansion that intensified land pressure and diminished natural catchment areas. These conditions confirm the inadequacy of short-term mitigation efforts to halt the urban flood cycle. Suliyati (2014), attributes this systemic failure to fragmented, unintegrated planning; specifically, overlapping new drainage projects neglected the foundational role of the Banjir Kanal Barat as the primary reservoir for the converging Garang, Kreo, and Kripik watersheds. A similar pattern is shown in the study by Lasminto et al. (2016). Flood disaster mitigation efforts in the Bengawan Solo Watershed, which serves as a lifeline for the residents of Solo, experienced comparable issues due to a partial approach that was not fully realized.

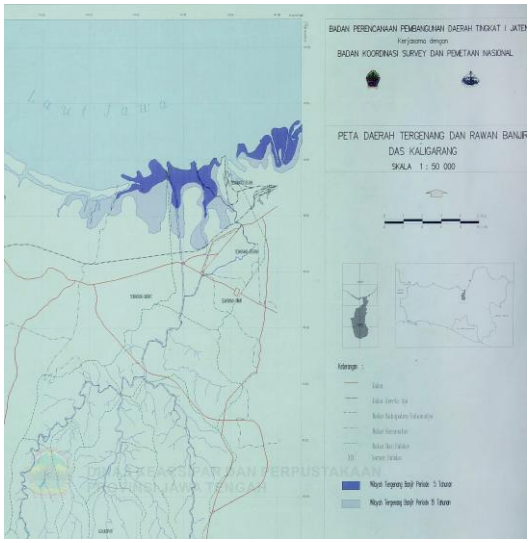

Figure 3. Map of Inundated and Flood-Prone Areas of the Kali Garang Watershed, 1992 (Dinas Kearsipan dan Perpustakaan Provinsi Jawa Tengah, 1997).

In the same year, the Semarang City Government inaugurated a new residential area designated for flood-affected communities and residents who previously resided in flood-prone zones. This policy represented a definitive step in the long-term restructuring efforts of the Kali Garang Watershed area. This integrated relocation area was named the Kuwasenrejo Replacement Settlement (*Permukiman Pengganti* or Permukti), which is administratively located in Sadeng Sub-district, Gunungpati. The selection of this site was based on the geographical considerations of the region, which was relatively more stable and safe from flood risks; meanwhile, the former residential areas were to be repurposed into green belts (Priyanto & Nawiyanto, 2014). In addition to providing housing, the government also equipped the area with supporting infrastructure, ranging from adequate road access networks for resident mobility to socio-religious facilities such as the Attaqwa Mosque.

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Figure 4. Inauguration of the Settlement and Mosque in Sadeng Sub-district, Gunungpati (Dinas Arsip dan Perpustakaan Kota Semarang, 1992).

Subsequently, in 1993, normalization of the downstream areas of the Kali Garang Watershed was carried out, specifically along the Banjir Kanal Barat. As a consequence of this normalization project, settlements in the riparian zones were subject to eviction. This action triggered resistance, as some residents living near the embankments showed reluctance to be relocated to the Sadeng area. This hesitation was motivated by the inadequacy of the compensation funds provided to build houses on the allocated land (Widodo & Pasaribu, 2021). These circumstances prompted residents to choose other locations, taking economic and employment factors into consideration.

The concepts for the Kali Garang revitalization and an upstream dam did not emerge instantaneously. Following a post-disaster assessment on February 7, 1990, by an International Red Cross delegation led by Carl Naucher, the Mayor of Semarang proposed normalizing the watershed and constructing an upstream flood control dam (KARTIKA, 1990). Ultimately, this international visit catalyzed the formulation of long-term mitigation policies by both municipal and central governments.

Concurrently, the government initiated the construction of the Jatibarang Dam. Designated as a National Strategic Project, this massive infrastructure was projected to function as the definitive flood control system for Semarang City (Wawasan, 1990). The Pemali Juana River Basin Organization (*Balai Besar Wilayah Sungai* or BBWS Pemali Juana) was appointed as the main authority responsible for the implementation of this project. The planning phase for this project began between April 1992 and September 1993, in cooperation with the Japanese Government through the Japan International Cooperation Agency (JICA) (BBWS Pemali Juana, 2020). The planning phase for this dam project continued until 2008. Throughout those years, the project faced adjustment challenges. Technical modifications were made to the flood control period design, shifting from the initial 100-year cycle design to a 50-year cycle (BBWS Pemali Juana, 2020).

Upon closer examination, the central government's decision channeled through the Ministry of Public Works to involve foreign entities in local flood control infrastructure projects highlights the state's financial and technical limitations in executing public works, a situation reminiscent of the dynamics during the construction of the Jatiluhur Dam in Purwakarta, West Java. This finding is consistent with the study by Fatahilah (2013), which indicates that the integration of the Kali Garang Watershed management planning remains on a low-to-moderate scale. This case highlights the persistent need for well-structured human resource empowerment and robust financial resilience.

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Amidst the implementation of the Jatibarang Dam project, BBWS Pemali Juana also carried out normalization work once again along the Kali Garang Watershed. This normalization project lasted from November 2010 to November 2013. In its execution, BBWS collaborated with several contractors, namely PT Waskita Karya, PT Brantas Abipraya, and PT Wijaya Karya, as well as the supervising consultant CTI Engineering (Widyanti et al., 2014). Regarding land acquisition for the normalization, BBWS Pemali Juana coordinated with the Water Resources Management Agency (*Dinas Pengelolaan Sumber Daya* Air or PSDA) and the Energy and Mineral Resources Agency (*Dinas Energi dan Sumber Daya Mineral* or ESDM). Following the normalization of the Banjir Kanal Barat and Kali Garang areas, the water discharge capacity proved to have increased significantly. Specifically, for the Banjir Kanal Barat flow, the capacity, which initially ranged between 300–400 m^3/second, was successfully increased to 730 m^3/second (Widyanti et al., 2014).

The Kali Garang normalization project and the construction of the Jatibarang Dam were completed simultaneously at the end of 2013. The dam was inaugurated by the Minister of Public Works, Djoko Kirmanto, and the Governor of Central Java, Ganjar Pranowo, on May 5, 2014, and officially became operational on May 11, 2015. The budget allocated for this project was Rp316 billion (Kementerian Pekerjaan Umum, 2014). Concurrently, rehabilitation was also carried out at the Simongan Dam, located in the downstream area of Kali Garang, with a budget allocation of Rp36 billion. In accordance with its primary function, this dam is projected to assist in controlling water discharge along the Kali Garang Watershed.

Technically, the Jatibarang Reservoir, part of the Jatibarang Dam, is designed as a multi-purpose facility. Its primary function is a flood control system through a mechanism to accommodate excess water volume. Furthermore, this reservoir serves to supply agricultural irrigation needs and domestic water supply for the community, and it is integrated as a Hydroelectric Power Plant facility (Salsabila et al., 2025). Jatibarang reservoir has a water storage capacity of 20.4 million m^3, with a catchment area reaching 54 km^2. Physically, the dam was constructed with a height of 77 meters, a crest length of 200 meters, and a width of 10 meters. Its inundation area covers 189 hectares of land spanning two administrative regions, namely Mijen District and Gunungpati District (BBWS Pemali Juana, 2020). The selection of this area was based on safety requirements and applicable technical feasibility.

The consequences of spatial utilization for this reservoir also impacted the surrounding environment. Several forest areas and community-owned plantations were cleared to support the sustainability of the infrastructure development (BBWS Pemali Juana, 2020). Various economically valuable vegetations previously cultivated on the land included commodities such as bamboo, coffee, sugar palm, and hardwood trees like teak, mahogany, and sengon.

As a conservation effort for the communities affected post-dam construction, the municipal government organized empowerment programs in the form of skill and income enhancement training (BBWS Pemali Juana, 2020). This step was taken to improve the economic standards of the affected residents, aligning with the initial objectives of the dam's construction. The training focus covered the fields of fisheries, livestock, trade or corporate business, and building construction. Several agencies were involved in the implementation of the training, including the Office for Cooperatives and Small and Medium Enterprises (*Dinas Koperasi dan Usaha Kecil Menengah*), the Office for Industry and Trade (*Dinas Perindustrian dan Perdagangan*), the Cooperative Training Center (*Balai Latihan Koperasi*), the Office for Transmigration and Manpower (*Dinas Transmigrasi dan Tenaga Kerja*), the Agriculture Office (*Dinas Pertanian*), and the Maritime Affairs and Fisheries Office (*Dinas Kelautan dan Perikanan*). This finding is in agreement with the study by Salsabila et al. (2025), which explains that conservation efforts are not the sole responsibility of a specific sector. The government, as the holder of regulatory authority, needs to map out and embrace all entities that have an interest in the environmental and social sustainability of the related area.

Concurrently, the discourse by Shoko et al. (2026) elucidates a comparable pattern regarding socio-ecological dynamics in conservation zones such as the Jatibarang Dam. Designating a region for resource management and tourism frequently disrupts local social systems. This phenomenon fundamentally stems from economic vulnerabilities, as communities remain heavily reliant on the area's natural resources for their livelihoods while facing systemic exclusion from equitable benefit-sharing mechanisms.

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 15 No. 2. Juni 2026 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

To address this issue, integrated community empowerment programs driven by cross-agency collaboration are required. Going beyond the existing skill and income enhancement training programs, periodic monitoring is also essential to ensure the socio-economic stability of the communities affected by the area's conservation policies. Furthermore, ensuring the success of these empowerment initiatives undoubtedly requires robust coordination among the relevant institutions.

CONCLUSION

The 1990 flash flood, distinguished as the most severe inundation of the latter half of the 20th century, significantly altered the socio-environmental and economic landscape of the Kali Garang Watershed. Historically, the correlation between the disaster's profound impacts and subsequent revitalization efforts revealed a chronic deficiency, wherein flood prevention policies remained strictly reactive and disjointed rather than fully structural. This partial approach primarily accounts for the persistent flood cycles historically afflicting the region. Nevertheless, in a concerted effort to break this cyclical threat, the central government demonstrated massive mitigative commitment. Driven by the Ministry of Public Works and BBWS Pemali Juana, the subsequent implementation of downstream normalization programs and the construction of the Jatibarang Dam National Strategic Project represented a pivotal transformation toward comprehensive macro-level flood control.

Specifically, this research enriches the existing literature regarding the governance of the Kali Garang Watershed following the 1990 flash flood. Through a historical lens, this study elucidates the dynamics of spatial planning transformation catalyzed by the disaster, notably highlighting the paradigm shift from a reactive approach toward a systematically structured framework.

While striving for a comprehensive analysis, this study is inherently constrained by its specific 1990 to 2015 temporal scope and a methodological reliance on print media archives and official government reports. Consequently, the nuanced dynamics of grassroots resistance against the structural impacts of flood mitigation policies remain underexplored. To bridge this analytical gap, future research employing a social history approach is highly recommended to profoundly enrich the regional historiography of disaster mitigation.

REFERENCES

Abe, T., Wiwattanapantuwong, J., & Honda, A. (2014). Dark, cold and hungry, but full of mutual trust : Manners among the 2011 Great East Japan Earthquake victims. *Psychology in Russia: State of the Art*, *7*(1), 4–13. https://doi.org/10.11621/pir.2014.0101

Badan Pemeriksa Keuangan Republik Indonesia. (2007). UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 24 TAHUN 2007 TENTANG PENANGGULANGAN BENCANA. *Undang-undang (UU) No. 24 Tahun 2007*.

BBWS Pemali Juana. (2020). *Bendungan Jatibarang : Dari Kali Kreo untuk Keberlanjutan Sumber Daya Air dan Pengendali Banjir Kota Semarang.* Jakarta: Kompas.

Castillo, S. C., & Silva, C. P. (2025). How do environmental impact assessments fail to prevent social conflict? Government technologies in a dam project in Colombia. *Journal of Political Ecology*, *33*(1), 1072–1091. https://doi.org/10.2458/v27i1.23223

Desmond, H., Martini, R., & Nunik. (2015). Implementasi Kebijakan Pengelolaan Sungai Kanal Banjir Barat Atau Kaligarang Di Kota Semarang. *Jurnal Ilmu Pemerintahan Undip*, 126–135. https://www.neliti.com/publications/101486/implementasi-kebijakan-pengelolaan-sungai-kanal-banjir-barat-atau-kaligarang-di#cite

Dinas Arsip dan Perpustakaan Kota Semarang. (1992). Figure 4. Inauguration of the Settlement and Mosque in Sadeng Sub-district, Gunungpati. Retreived 29 October 2024.

Dinas Kearsipan dan Perpustakaan Provinsi Jawa Tengah. (1997). Figure 3. Map of Inundated and Flood-Prone Areas of the Kali Garang Watershed, 1992. Retreived 29 October 2024.

Emalia, I. (2023). Kesehatan dan Lingkungan dalam Perspektif Sejarah: Perkembangan Baru Historiografi Indonesia.

Jurnal Sejarah Indonesia, *6*(2), 105–120. https://doi.org/10.62924/jsi.v6i2.32602

Fatahilah, M. (2013). Kajian Keterpaduan pengelolaan Daerah Aliran Sungai (DAS) Garang Provinsi Jawa Tengah. *Jurnal Geografi*, *10*(2), 136–153. https://journal.unnes.ac.id/nju/JG/article/view/8058/5585

Harini, O. R., & Wijayati, P. A. (2025). Tumbuhnya Solidaritas Sosial di Tengah Banjir Bandang Semarang Tahun 1990. *Jurnal Widya Winayata: Jurnal Pendidikan Sejarah*, *13*(2), 179–194. https://doi.org/10.23887/jjps.v13i2.98213

Herlina, N. (2020). *METODE SEJARAH* (2nd ed.). Satya Historika.

Hudha, A. M., Husamah, & Rahardjanto, A. (2019). *ETIKA LINGKUNGAN (Teori dan Praktik Pembelajarannya)*. Penerbit Universitas Muhammadiyah Malang.

Indrayati, A., Aji, A., & Hikmah, N. I. (2018). 3D model and morphometry of the Beringin watershed as an effort for flash flood disaster risk reduction in Semarang. *MATEC Web of Conferences*, *229*(04010), 1–9. https://doi.org/10.1051/matecconf/201822904010

KARTIKA. (1990, Februari 5). Bantuan Lewat Propinsi Rp 687,7 Jt, Korban Meninggal "Hanya" 128 Orang. Retrieved 29 October 2024.

KARTIKA. (1990, Februari 7). Gratis, Pembangunan Rumah Akibat Bencana Banjir. Retrieved 29 October 2024.

KARTIKA. (1990, Januari 27). Kerugian Akibat Banjir Sekitar Rp 6 Milyar. Retrieved 7 October 2024.

KARTIKA. (1990, Januari 27). Tanah-tanah Gundul Di Ungaran Dan Gunungpati Sebabkan Banjir. Retrieved 7 October 2024.

KARTIKA. (1990, Januari 27). Semarang Dibelah Banjir, Sudah 48 Orang Ditemukan Meninggal. Retrieved 7 October 2024.

KARTIKA. (1990, Februari 28). Walikota Serahkan Bantuan Bagi Sekolah-sekolah Korban Banjir. Retrieved 29 October 2024.

KARTIKA. (1990, Januari 29). Pabrik Yang Rusak Dilarang Dibangun Kembali. Retrieved 7 October 2024.

KARTIKA. (1990, Januari 29). Daftar Nama Korban Banjir di Semarang. Retrieved 7 October 2024.

KARTIKA. (1990, Januari 29). Figure 1. Damage to the Damaitex Factory Resulting from the Flood Surges. Retreived 7 October 2024.

Kementerian PUPR. (2010). Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat Nomor 18/PRT/M/2010 Tahun 2010 tentang Pedoman Revitalisasi Kawasan. *Kementerian Pekerjaan Umum Dan Perumahan Rakyat*, 1–47. https://peraturan.bpk.go.id/Details/160056/permen-pupr-no-18prtm2010-tahun-2010

Kementerian Pekerjaan Umum. (2014, Mei 5). *Ditemani Ganjar, Menteri PU resmikan waduk Jatibarang Semarang*. From Kementerian Pekerjaan Umum: https://sda.pu.go.id/balai/bbwspemalijuana/pages/posts/ditemani-ganjar-menteri-pu-resmikan-waduk-jatibarang-semarang-1612928730

Lasminto, U., Lumantara, E., Widyastuti, H., & Zharin, F. (2016). FLOOD ASSESSMENT OF BENGAWAN SOLO RIVER. *ARPN Journal of Engineering and Applied Sciences*, *11*(24), 14443–14450. https://scholar.its.ac.id/en/publications/flood-assessment-of-bengawan-solo-river/

Maftuhin, M., & Kusumawardani, D. (2022). Pengaruh Perubahan Iklim dan Bencana Alam terhadap Kriminalitas di Indonesia. *Media Komunikasi Geografi*, *23*(1), 129–140. https://doi.org/10.23887/mkg.v23i1.42332

Nurhayati, P. F., & Subekti, S. (2022). Kebijakan Pemerintah dalam Mengatasi Banjir di Kota Semarang 1975-2000. *Historiografi*, *3*(1), 85–92. https://ejournal3.undip.ac.id/index.php/historiografi/article/view/37229

Priyanto, E. H., & Nawiyanto, N. (2014). Banjir Bandang di Kodya Semarang Tahun 1990. *Jurnal PUBLIKA BUDAYA*, *3*(2), 9–17. https://www.neliti.com/publications/191461/banjir-bandang-di-kodya-semarang-tahun-1990-the-municipality-of-semarang-in-1990

Rukayah, R. S. (2020). Konservasi Arsitektur. In *Konservasi dan Revitalisasi* (pp. 21–32). UNDIP Press, Arsitektur UNDIP. https://eprints.undip.ac.id/81765/

Salsabila, F. Y., Purnaweni, H., & Herawati, A. R. (2025). PERAN STAKEHOLDERS DALAM KONSERVASI SUMBER DAYA AIR DI WADUK JATIBARANG KOTA SEMARANG. *Journal of Management and Public*

Policy, *13*(3), 1149–1160. https://ejournal3.undip.ac.id/index.php/jppmr/article/view/45827

Shoko, J., Muboko, N., & Gandiwa, E. (2026). An exploration of perceptions and trust: analyzing the factors influencing relationships between local communities and wildlife conservation-based developments in the Save Valley Conservancy, Southeast Zimbabwe. *Sustainable Communities*, *3*(1), 1–16. https://doi.org/10.1080/29931282.2026.2648915

Suara Merdeka. (1990, Februari 3). Hari Ini Mendagri Tinjau Lokasi Banjir. Retrieved 2 October 2024.

Suara Merdeka. (1990, Februari 4). Mulai Dibangun Pemukiman Baru di Gunung Pati bagi Para Korban. Retrieved 29 October 2024.

Suara Merdeka. (1990, Februari 7). Daerah Banjir Bandang Juga Tergolong Tanah Rawan Gerak. Retrieved 29 October 2024.

Suara Merdeka. (1990, Februari 9). Muncul Selebaran Gelap di Daerah Bencana Banjir. Retrieved 2 October 2024.

Suara Merdeka. (1990, Februari 13). Akibat Banjir, Kerugian di Smg Rp 8,5 Miliar 782 Rumah Rusak. Retrieved 2 October 2024.

Suara Merdeka. (1990, Januari 27). 47 Tewas Diterjang Banjir Bandang di Kota Semarang. Retrieved 2 October 2024.

Suara Merdeka. (1990, Januari 27). Figure 2. Conditions of Evacuation Tents for Flash Flood Victims. Retrieved 2 October 2024.

Suara Merdeka. (1990, Januari 29). Jam malam Kini Diberlakukan di Sampangan. Retrieved 29 October 2024.

Suara Merdeka. (1990, Januari 31). Dikerahkan 50 Shinse serta Dokter Jiwa di Lokasi Banjir. Retrieved 2 October 2024.

Suara Merdeka. (1990, Juni 5). Saluran Pengelak Banjir Harus Rampung November. Retrieved 2 October 2024.

Suliyati, T. (2014). Penataan Drainase Perkotaan Berbasis Budaya. *Humanika*, *19*(1), 59–69. https://doi.org/10.14710/humanika.19.1.59-69

Surya, A. E. (1990, Februari 2). DAS Banjirkanal Barat perlu diselamatkan. Wawasan. Retrieved 29 October 2024.

Utama, N. J., & Lusianto, dan J. F. (2020). Jejak Histori dan Peranan Sungai di Kota Semarang pada Awal Abad 20. *Journal of Indonesian History*, *9*(2), 167–177. https://journal.unnes.ac.id/sju/jih/article/view/36612

Wawasan. (1990, Februari 2). Data Terakhir di Polrestabes Semarang, 87 Orang tewas akibat banjir. Retrieved 29 October 2024.

Wawasan. (1990, November 6). Walikota akan bendung kali Garang Semarang. Retrieved 29 October 2024.

Widodo, S. K., & Pasaribu, N. L. (2021). Semarang Flash Flood 1990. *E3S Web of Conferences*, *317*, 1–9. https://doi.org/10.1051/e3sconf/202131704015

Widyanti, P., Kismartini, & Maesaroh. (2014). Implementasi Kebijakan Penanggulangan Banjir (Studi Kasus Proyek Normalisasi Banjir Kanal Barat dan Kali Garang Kota Semarang). *Journal of Management & Public Policy*, *3*(3), 123–131. https://ejournal3.undip.ac.id/index.php/jppmr/article/view/5729