

Power Dynamics and Multi-Stakeholder Collaborative Governance: Unveiling Stakeholder Interests in the Citarum Harum Program

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Abstract

This study aims to analyze the dynamics of power and multi-stakeholder collaborative governance in the Citarum Harum Program using the Regulatory Capture approach, focusing on information asymmetry, collusion, and regulatory consequences. This study used a qualitative and case study approach. The documents analyzed were purposively selected based on temporal proximity (2019-2025), thematic relevance to regulatory capture, and source credibility. Data were analyzed using a thematic analysis approach. Triangulation was applied by comparing findings from scientific articles, government documents, NGO reports and media articles to ensure data consistency. Findings reveal that unverified industry-dominated data biases policy decisions, while collusion in project procurement limits access for small industries and local communities. Weak oversight mechanisms exacerbate regulatory transparency issues, affecting program effectiveness. Despite an increase in the Citarum River Water Quality Index from 33.43 (2018) to 50.78 (2023), pollution remains a critical challenge. As a scientific contribution, this study proposes the Citarum Sustainable Governance Model (CSGM) with six key components: (1) Digital transparency via e-Government, ensuring all procurement stages are digitally recorded and independently audited; (2) Citarum Sustainability Council Forum, fostering multi-stakeholder collaboration through periodic discussions on budget allocation, project progress, and policy evaluation; (3) Community-based audits via e-governance, where trained local communities monitor and report discrepancies through an established platform; (4) Transparent law enforcement, including an environmental court and a secure whistleblower system to report violations; (5) Incentive and education programs, providing micro-grants and continuous training to enhance environmental monitoring capacity; and (6) A reward and sanction system for regulators and contractors, where ethical performance is incentivized while collusion results in penalties. This model aims to mitigate regulatory capture, enhance transparency, and strengthen a fair and sustainable environmental governance framework.

Keywords: Environmental Governance, Multi-Stakeholder Collaboration, Regulatory Capture and Policy Transparency, Participatory Governance.

Abstrak

Penelitian ini bertujuan untuk menganalisis dinamika kekuasaan dan tata kelola kolaboratif *multi-stakeholder* dalam Program Citarum Harum dengan pendekatan *Regulatory Capture*, berfokus pada asimetri informasi, kolusi, dan konsekuensi regulasi. Studi ini menggunakan pendekatan kualitatif dan studi kasus. Dokumen yang dianalisis dipilih secara purposif berdasarkan kedekatan temporal (2019–2025), relevansi tematik terhadap *regulatory capture*, dan kredibilitas sumber. Data dianalisis menggunakan pendekatan analisis tematik. Triangulasi diterapkan dengan membandingkan temuan dari artikel ilmiah, dokumen pemerintah, laporan LSM, dan artikel media guna memastikan konsistensi data. Hasil penelitian menunjukkan bahwa dominasi data industri yang tidak diverifikasi independen menyebabkan kebijakan yang bias, sementara kolusi dalam pengadaan proyek menghambat akses bagi industri kecil dan masyarakat lokal. Keterbatasan mekanisme pengawasan memperburuk transparansi regulasi, yang berdampak pada efektivitas program. Meskipun Indeks Kualitas Air Sungai Citarum meningkat dari 33,43 (2018) menjadi 50,78 (2023), pencemaran tetap menjadi tantangan utama. Sebagai kontribusi ilmiah, penelitian ini mengusulkan *Citarum Sustainable Governance Model (CSGM)* dengan enam elemen utama: (1) transparansi digital melalui *e-Government*, untuk mencatat setiap tahap pengadaan

secara digital serta melakukan audit independen secara rutin (2) Forum *Citarum Sustainability Council* untuk kolaborasi multipihak dan berdiskusi secara periodik mengenai alokasi anggaran, kemajuan proyek, dan evaluasi kebijakan, (3) audit berbasis komunitas melalui *e-governance*, di mana masyarakat lokal dilatih untuk memantau dan melaporkan ketidaksesuaian melalui platform *e-governance* yang sudah ada (4) penegakan hukum yang transparan melalui pembentukan pengadilan lingkungan khusus dan sistem *whistleblower* yang aman untuk melaporkan penyimpangan, (5) Program insentif dan edukasi yang menyediakan *mikro-grant* serta pelatihan berkelanjutan dalam rangka meningkatkan kapasitas pengawasan lingkungan, serta (6) sistem penghargaan dan sanksi bagi regulator dan kontraktor. Model ini bertujuan untuk mengurangi *regulatory capture*, meningkatkan transparansi, serta memperkuat tata kelola lingkungan yang berkelanjutan dan berkeadilan.

Kata Tata Kelola Lingkungan, Kolaborasi *Multi-stakeholder*, Penegakan Peraturan dan Transparansi Kebijakan, Tata Kelola Partisipatif.

INTRODUCTION

The Citarum watershed serves as a water source and sustains socio-economic development in the West Java region. Stretching 297 kilometers across 13 districts/cities, the Citarum watershed sustains critical domestic water supplies, supports extensive agricultural irrigation, and provides energy for a wide range of industrial activities. In addition, the basin plays an important role in maintaining local ecosystems and preserving biodiversity, which is indispensable for long-term environmental sustainability. With these contributions, the health and resilience of the Citarum River is of paramount importance. However, decades of industrial and domestic pollution have damaged its ecological integrity, leading to water scarcity and public health risks. This degradation not only weakens the watershed's capacity to support sustainable development, but also increases socio-economic challenges for the communities that depend on it (Ayyasy et al., 2021; Engkus et al., 2022; Rosana et al., 2013).

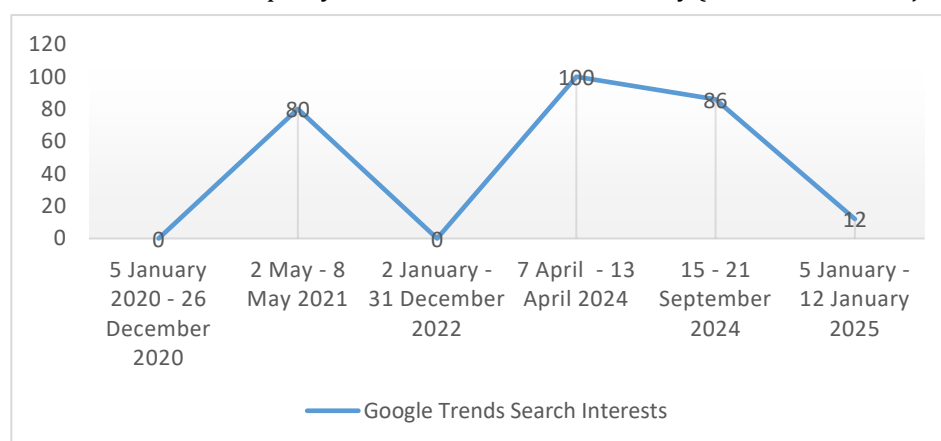
In response to the escalating environmental crisis, the government launched the Citarum Harum Program as an ambitious initiative to revitalize the Citarum River. This program unites a diverse range of stakeholders—including governmental agencies, industry players, local communities, and academic institutions—to collaboratively restore water quality and promote sustainable community development. Key interventions include upgrading wastewater treatment facilities, restoring riverbanks through reforestation, and establishing robust monitoring mechanisms to enforce environmental standards. Moreover, the integration of innovative digital tools and public reporting platforms has been implemented to enhance transparency and accountability throughout the program's execution. Despite these comprehensive efforts, persistent challenges in coordination, resource allocation, and stakeholder engagement continue to question the overall effectiveness of the intervention (Ayyasy et al., 2021; Firzah et al., 2022).

Despite comprehensive intervention efforts, the implementation of the Citarum Harum Program has encountered significant obstacles, revealing a wide gap between its normative vision and on-ground realities. Although the Water Quality Index (WQI) improved from 33.43 in 2018 to 50.78 in 2023, persistent domestic and industrial pollution indicates that the program's environmental outcomes remain unsatisfactory (Renaksi PPK DAS Citarum, 2019). Initially supported by

Presidential Regulation Number 15 of 2018 (Government of the Republic of Indonesia, 2018)—which mandates active participation from government, local communities, the private sector, and academia—the program has struggled due to a highly centralized decision-making process and the dominant role of military and governmental actors, which marginalizes local community engagement and adaptive responses (Firzah et al., 2022; Mariane et al., 2022; Novalia et al., 2022; Rosana et al., 2013).

Moreover, the ambitious regulatory framework is undermined by inadequate coordination, insufficient resource allocation, and weak enforcement mechanisms. These deficiencies not only impede sustainable water quality improvements and ecosystem restoration but also facilitate regulatory capture, enabling entrenched political and economic elites to distort transparency and accountability (Erianti & Djelantik, 2019; Irawan, 2013). Consequently, these discrepancies underscore the urgent need for a more decentralized and inclusive governance model to restructure the program's regulatory and implementation mechanisms (Aziz & Andri, 2021; Dal Bó, 2006; Mustofa et al., 2021).

In addition to implementation challenges, public response and underlying power dynamics further complicate governance of the Citarum Harum Program. Public sentiment, as evidenced by fluctuations in Google Trends data, reveals how policy moments resonate with society (Aminah, 2006; Sarjito, 2024);



Graphic 1. Trend of Public Search Interest in Citarum Harum Program in Indonesia (2020-2025)

Source: Google Trends, (Processed by researchers, 2025)

Graphic 1. During early 2020 and throughout 2022, search interest registered at 0, indicating minimal public engagement. In contrast, a surge to 80 in May 2021, a peak of 100 in early April 2024, and a notable value of 86 in mid-September 2024 demonstrate heightened public attention during key intervention periods. However, a marked drop to 12 in early January 2025 signals declining relative popularity—this does not necessarily reflect a reduction in absolute search volume but rather a decrease in comparative prominence. The figures are normalized on a scale from 0 to 100, where each value is relative to the highest observed point. These trends underscore how external events trigger shifts in public engagement, which in turn can pressure policymakers. Furthermore, the pronounced influence of political and economic elites—evidenced by the dominant role of military and governmental actors—has often marginalized local community voices, contributing to a cycle of regulatory capture in which policy decisions are insulated from public scrutiny and accountability (Aminah, 2006; Dal Bó, 2006; Sarjito, 2024).

Although previous studies on the Citarum Harum Program have largely concentrated on technical aspects such as waste management and water quality improvements (Abdillah et al., 2024; Mustofa et al., 2021; Rosana et al., 2013), there remains a significant gap in critically examining the underlying power dynamics and governance challenges. Specifically, few studies have systematically applied a power theory approach to dismantle inequalities in the governance of the Citarum River Basin, thereby overlooking the influence of entrenched political and economic interests. The centralization of decision-making and the dominant role of military and governmental actors have marginalized local community participation, reducing transparency and

accountability (Mariane et al., 2022; Novalia et al., 2022). These deficiencies underscore the need for a more rigorous analysis of power relations to understand the discrepancies between the program's normative goals and its on-ground implementation (Aziz & Andri, 2021; Dal Bó, 2006).

In response to these gaps, this study adopts the Regulatory Capture theoretical framework to systematically examine how information asymmetry, collusion, and regulatory consequences collectively influence policy outcomes in the Citarum Harum Program. Specifically, the study aims to: (1) determine how imbalances in information access contribute to biased policymaking; (2) assess the role of collusive practices in undermining transparent procurement processes; and (3) evaluate the impact of regulatory shortcomings on environmental sustainability. By integrating these dimensions, the research seeks to unravel the complex interplay among regulators, military actors, industry stakeholders, and local communities, thereby offering critical insights for the development of more effective and inclusive governance reforms (Ayyasy et al., 2021; Aziz & Andri, 2021; Dal Bó, 2006; Engkus et al., 2022; Firzah et al., 2022; Novalia et al., 2022).

RESEARCH METHOD

This study employs a qualitative case study design with a focus on secondary data analysis. Documents published between 2019 and 2025 were selected purposively based on three criteria: temporal proximity, thematic relevance to regulatory capture, and source credibility (i.e., official government institutions, reputable NGOs, and national media outlets). The selection strategy ensures that only data reflecting recent policy changes and contextual evidence are included. Data were analyzed using Braun and Clarke's (in Heriyanto, 2018) thematic analysis approach. The analysis involved four systematic stages: (1) familiarization with the data through repeated readings to gain an in-depth understanding, (2) initial coding to label salient features, (3) theme discovery by organizing codes into candidate themes, and (4) theme review to refine and validate the themes against the entire dataset. This rigorous process enables a detailed interpretation of how power dynamics and regulatory shortcomings manifest in the Citarum Harum Program. Triangulation was conducted by comparing information from government documents, NGO reports, and media articles within the same period, thereby confirming the consistency of emergent themes (Heriyanto, 2018). Additionally, the analysis was carried out with strict adherence to principles of source openness, proper attribution, and vigilance against potential framing bias in media representations. This methodology will strengthen the validity of the findings and support a nuanced examination of regulatory capture in environmental governance (Heriyanto, 2018; Creswell, 2016).

RESULTS AND DISCUSSION

Uncovering the Implications of Information Asymmetry in the Governance of Citarum Watershed Revitalization

Information asymmetry is one of the main challenges in the implementation of the Citarum Harum Program. This phenomenon can be seen in the unequal access to information between regulators, industry players, and the public (Dal Bó, 2006). Research findings show that regulators often only have data derived from industry reports without any independent verification mechanism (Novalia et al., 2022). This creates conditions where the information used for policy making tends to be biased and does not fully reflect the reality on the ground.

According to data from the Citarum Watershed Action Plan (2019-2025), the pollution level of the Citarum watershed as measured by the Water Quality Index (WQI) showed an increase from 33.43 in 2018 to 38.57 in 2023 (Renaksi PPK DAS Citarum, 2019). However, this achievement is not yet in line with sustainability targets as pollution from domestic and industrial waste remains high. Most pollution data comes from reports from industry players, who often manipulate data to avoid sanctions (Hadfield et al., 2024; Novalia et al., 2022). For example, of the 993 industries monitored in 2023, only 80% were found to be compliant (Renaksi PPK DAS Citarum, 2019), despite audit reports indicating serious violations in some areas.

The lack of transparency in data management also worsens the situation. Based on research (Brotosusilo et al., 2019; Novalia et al., 2022), communities and environmental advocacy groups have limited access to information on the water quality of the Citarum watershed. This data disclosure should be a priority to build public trust in the program. Instead, the public's lack of access to data makes it difficult for them to monitor policy effectiveness and provide constructive feedback. This condition reinforces the dominance of industry players and weakens the role of the community as a policy watchdog (Abdillah et al., 2024; Mariane et al., 2022).

This unbalanced use of information also significantly impacts strategic decision-making. Several large industrial actors who are indicated to have political connections often leverage their influence to exploit policy loopholes for economic gain. For instance, some corporations have successfully avoided sanctions for waste management violations by claiming that imposing penalties would negatively impact regional economic stability. These arguments, frequently accepted without rigorous evaluation, set a dangerous precedent in environmental governance, allowing compliance measures to be selectively enforced rather than uniformly applied. Such practices illustrate how information asymmetry not only skews regulatory enforcement in favor of influential industry actors but also exposes fundamental weaknesses in governance mechanisms meant to uphold transparency and accountability (Erianti & Djelantik, 2019; Hadfield et al., 2024; Novalia et al., 2022). In line with Dal Bó, (2006) concept of regulatory capture, this condition reinforces the disproportionate influence of corporate and political interests in shaping environmental policies, further undermining equitable and sustainable regulatory practices.

One specific example is the lack of supervision of wastewater treatment plant (WWTP) operations. Despite WWTPs being an important component in pollution control, research shows that many installations are not functioning optimally due to a lack of effective maintenance and supervision. Data from the Renaksi PPK DAS Citarum, (2019) shows that only 60% of the supervised WWTPs are able to operate according to standards, while the rest do not meet the criteria due to the lack of technical support and operational funds. The following table summarizes the targets for improving IKA and the level of industry compliance with effluent regulations:

Table 1. Summary of IKA Target & Industry Compliance Level with Waste Regulations

Year	Number of Industries Supervised	Percentage of Industry Compliance (%)
2018	189	15,2%
2019	250	20%
2020	497	40%
2021	745	60%
2022	993	80%
2023	1242	80%

Source: Renaksi PPK DAS Citarum (2019-2025)

Table 1. illustrates the increase in the number of supervised industries and their compliance rate with effluent regulations over the period 2018-2023. In 2018, only 189 industries were supervised with a compliance rate of 15.2%. However, by 2023, the number of supervised industries increased sharply to

1,242, with the compliance percentage stagnating at 80% since 2022. This data reflects two things: first, there has been a significant increase in the government's supervisory capacity from year to year; second, despite the increase in supervision, the compliance rate does not reach the ideal target of 100%, suggesting structural or operational constraints in ensuring regulatory enforcement (Renaksi PPK DAS Citarum, 2019).

The increase in the number of industries supervised is an important achievement, but the stagnation of the compliance rate since 2022 indicates gaps in the effectiveness of supervision and sanction implementation. This phenomenon could be due to factors such as weak independent audit mechanisms, lack of transparency, or even potential conflicts of interest between policy makers and industry players. The study by Suwarso et al. (2022) revealed that large industry players often use political-economic pressure to avoid sanctions, exacerbating the problem of unfairness in law enforcement.

Moreover, the regulatory framework of the Citarum Harum Program appears to suffer from hidden deregulation and a failure to achieve long-term accountability. Although the program is formally mandated to enforce stringent environmental standards on waste disposal, evaluations by the Audit Board (BPK) have criticized its suboptimal performance since 2015, primarily due to inadequate facilities for managing domestic and industrial waste (Anggraini, 2019). While environmental regulations have been formally implemented, there are indications of silent deregulation—such as the potential relaxation of operational requirements for wastewater treatment facilities—which indirectly undermines enforcement effectiveness (Novalia et al., 2022).

Budisafitri et al., (2024) reveal that despite existing regulations, many factories continue to exceed prescribed limits due to weak law enforcement and low environmental awareness. Additionally, instances of discharging colored, malodorous liquid waste by PT. Daya Pratama Lestari and the closure of waste channels by Mie Gacoan Cilengkrang, coupled with several large industrial actors—indicated to have political connections—and certain state actors employing political-economic pressure to evade sanctions, further reinforce entrenched power imbalances (kontrolnews, 2024; Navretta, 2025; Novalia et al., 2022). The failure to achieve long-term accountability is compounded by poorly conceived policy design and weak implementation, as evidenced by Lestari et al., (2022) and Haq, (2019).

The lack of integrated planning, minimal inter-agency coordination, and limited involvement of local governments have resulted in ineffective rehabilitation efforts, such as forest restoration and critical land recovery, while budget allocations remain misaligned with recovery needs (Haq, 2019). Overall, although there is no direct evidence of overt hidden deregulation, recurrent violations and inadequate oversight systems confirm that current environmental regulations have yet to deliver sustained accountability and adaptive governance, necessitating an in-depth evaluation of both policy design and implementation practices.

Furthermore, these regulatory shortcomings have a direct impact on community involvement. The lack of transparency and limited access to updated monitoring data severely impede local communities' ability to monitor policy effectiveness and provide constructive feedback. Consequently, communities often become mere subjects of policy rather than active participants, as evidenced by community protests in the downstream areas of the Citarum watershed in 2022 (Novalia et al., 2022; Renaksi PPK DAS Citarum, 2019). These protests not only expose the government's failure to mitigate the detrimental effects of

industrial waste on local livelihoods but also highlight the deep-seated power imbalances in multi-stakeholder governance (Anggiono, 2020; Idris et al., 2019; Novalia et al., 2022; Walhi Jawa Barat, 2024). In addition, the following figure illustrates the ideal industrial waste management flow in the Citarum Harum Program, which incorporates a rigorous data verification process and independent audits to enhance accountability and transparency:

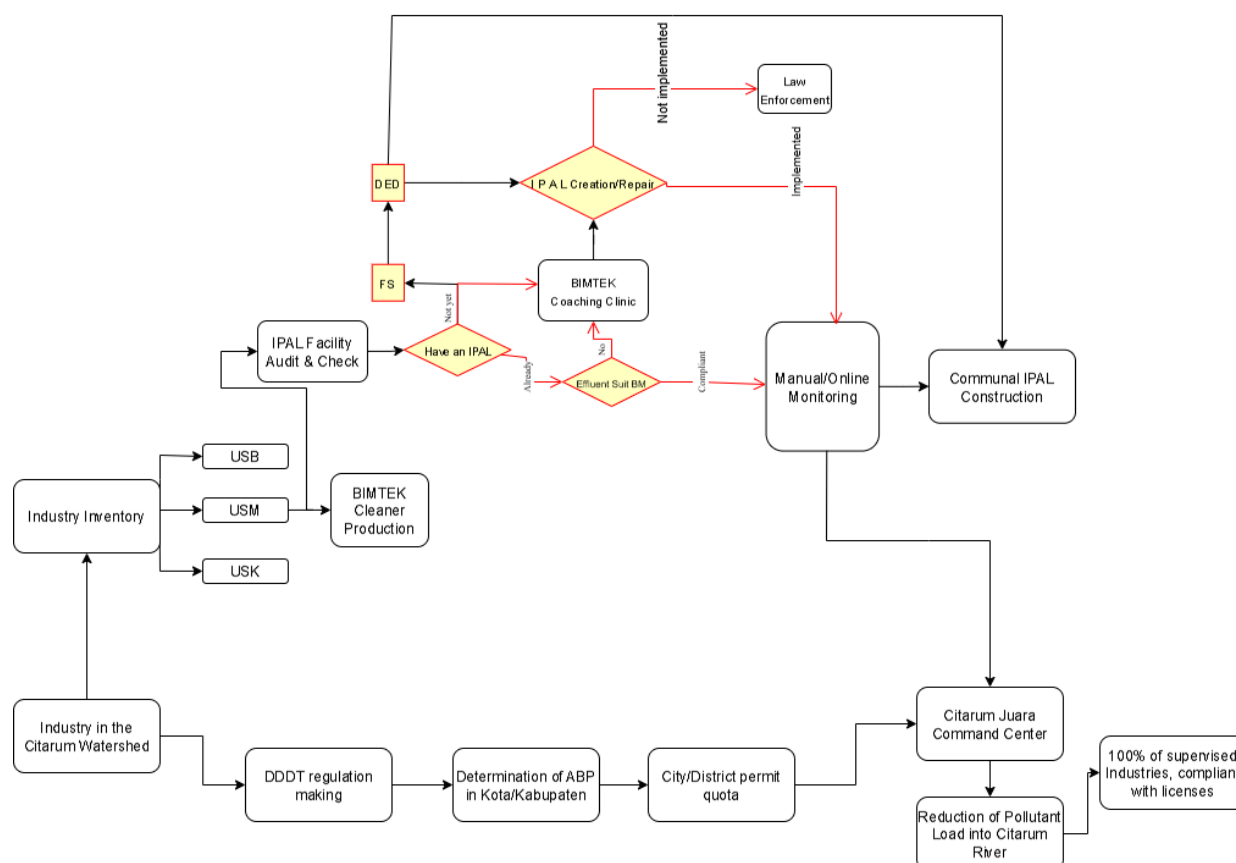


Figure 2. Flow of Industrial Waste Management Activities

Source: Renaksi PPK DAS Citarum, 2019 (Processed by researchers, 2025)

Figure 2. shows the workflow that includes industry inventory, IPAL construction, independent audit, and data publication. Each stage is designed to improve accountability and transparency in waste management (Renaksi PPK DAS Citarum, 2019). This finding indicates that although the Citarum Harum Program has an ambitious vision, implementation on the ground still faces major obstacles due to information asymmetry (Dal Bó, 2006). Gaps in access to and use of information create serious challenges for policy effectiveness, which ultimately harms the community and the environmental sustainability of the Citarum watershed.

The dimension of information asymmetry in the context of the Citarum Harum Program reflects the unequal access to information between regulators, the private sector, and local communities. Based on Regulatory Capture theory (Dal Bó, 2006), this imbalance occurs when certain parties with greater access to information, such as industry players, are able to utilize this advantage to influence policy. In the Citarum Harum Program, this phenomenon can be seen in the dominance of reports from the industry sector, which are often not independently verified, as stated by Novalia et al., (2022). This results in decision-

making that tends to be biased towards certain interests, while local communities are often deprived of the opportunity to participate meaningfully.

Previous studies such as Mustofa et al., (2021) and Rosana et al., (2013) show that information disclosure is a key element to create inclusive governance. However, in the Citarum Harum Program, the lack of local community involvement in the decision-making process exacerbates this gap. The Quintuple Helix approach (Abdillah et al., 2024), which emphasizes the importance of collaboration across actors, actually offers a relevant framework to ensure synergy between the government, academia, private sector, media, and communities. Unfortunately, implementation in the field shows that data integration between monitoring tools such as Onlimo, dashboard, and e-Monev is far from optimal.

The existence of the Citarum Task Force Command Center is actually a step forward in providing a centralized data management platform. Based on data from Prima Mayaningtias (2021), the command center integrates various monitoring devices, including Onlimo to monitor water quality in real-time, CCTV to monitor field conditions, and VTOL Drones used for broad surveillance. However, researchers found that although dashboards and features such as Onlimo are available, the data displayed are often not updated in a timely manner. For example, the water quality dashboard shows normal indicators at some monitoring points, but this data was last updated in August 2024, while the situation on the ground could have changed significantly by January 2025. These inaccuracies create challenges for responsive strategic decision-making. The following image shows the results of the researcher's search for Onlimo features that were not updated in a timely manner;

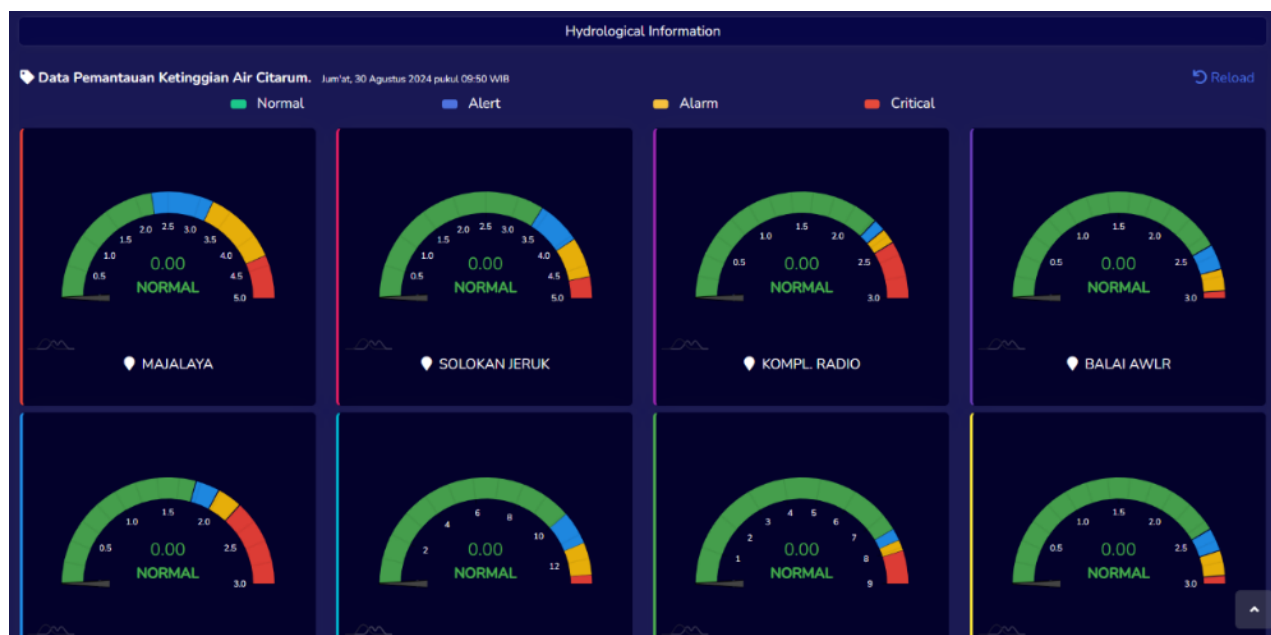


Figure 3. Onlimo Dashboard Features

Source: satgascitarum.jabarpov.go.id, (2025)

Figure 3 shows the dashboard of water level monitoring data at several points of the Citarum watershed with the status of “Normal” at all locations. The data was last updated on August 30, 2024, while the current date is January 2025. The mismatch in data update time is an indication that the system is not running optimally in providing real-time information, which should be an advantage of IoT (Internet of Things)-based monitoring technology.

This feature, while potentially supporting data-driven decision-making, faces significant limitations. One of the main challenges is the lack of consistent data updates. In this context, the Onlimo device is designed to monitor water quality based on parameters such as pH, DO (Dissolved Oxygen), TSS (Total Suspended Solids), and COD (Chemical Oxygen Demand) (citarum harum jabarprov, 2021). However, if the data presented is not regularly updated, its effectiveness becomes very limited, especially in the face of potential sudden changes in river conditions.

In addition, although additional technologies such as SPARING devices to detect industrial sewage outfalls and VTOL Drones with Wide Area Motion Imagery (WAMI) cameras have been implemented, data integration between devices is still a major challenge (citarum harum jabarprov, 2021). This disconnect causes the data analysis process to be slower and less accurate, which ultimately hinders evidence-based decision-making.

This condition indicates that the technology monitoring system designed to support transparency and accountability in the Citarum Harum Program requires serious optimization. With these technologies not effectively integrated and data frequently outdated, the primary function of providing real-time, accurate information is undermined, thus impeding informed decision-making. Efforts to enhance the integration among systems and ensure regular data updates are urgently needed to truly support the program's sustainability and revitalization goals. Moreover, selective disclosure through public dashboards may create an illusion of transparency by presenting only favorable or partial data, thereby concealing critical deficiencies such as data fragmentation and infrequent updates. This selective presentation not only masks underlying operational weaknesses but also facilitates technocratic control over the narrative, reinforcing the dominance of certain stakeholders. From the perspective of modern governance theory, Agranoff & McGuire, (2003) emphasize that successful cross-actor collaboration depends on the free flow of transparent and relevant information. However, the inability to fully integrate data from various sources poses a significant barrier in the Citarum Harum Program. Although the Command Center platform offers several monitoring tools—such as IoT monitoring and social media analytics—its effectiveness is often compromised by technical constraints and fragmented data, as highlighted by Hudson, (2020). This complexity further manifests in public participation, where the lack of open, accessible complaint mechanisms limits community engagement, rendering their involvement largely nominal (Novalia et al., 2022).

In this context, strategic steps that need to be taken to overcome information asymmetry include:

1. **Holistic Data Integration:**
An integrated system must be developed to consolidate data from diverse monitoring devices—including Onlimo, CCTV, and VTOL drones—to facilitate accurate, real-time, data-driven decision-making. Such integration addresses data fragmentation by unifying disparate data sources onto a single platform, thereby ensuring consistency and reducing information gaps.
2. **Increased Information Transparency:**
Public data from the Command Center should be made openly accessible through enhanced digital platforms. Interactive features, such as live reporting and feedback mechanisms, should be incorporated to foster genuine public engagement. This approach not only increases transparency but also prevents selective disclosure that could create an illusion of accountability, as incomplete or favorable data might mask critical operational deficiencies.
3. **Optimization of E-Monev:**
The monitoring and evaluation system (e-Monev) must be expedited and refined to guarantee that program reporting is transparent, measurable, and accessible to all

stakeholders. Improved e-Monev systems will bridge the gap between policy intentions and actual outcomes by providing timely performance metrics and facilitating corrective actions when deviations occur.

4. **Effective Multi-Stakeholder Collaboration:**

Strengthening collaboration among local communities, regulators, academic institutions, industry, and media is essential. Institutionalizing this collaboration through forums such as a “Citarum Sustainability Council” can ensure that all actors have an equal voice in decision-making. Regular, structured dialogue on strategic issues like budget allocation, project progress, and policy evaluation will enhance mutual accountability and diminish the risk of regulatory capture.

These measures, when implemented cohesively, are intended to reduce information asymmetry and foster a more transparent, accountable, and inclusive governance framework for the Citarum Harum Program (Agranoff & McGuire, 2003; Hudson, 2020).

Overall, the findings of this study indicate that the information asymmetry dimension in the Citarum Harum Program is one of the main obstacles that reduce the effectiveness of the Citarum watershed revitalization policy. The unequal access to information between regulators, industry players, and communities not only creates bias in decision-making but also weakens community participation as a policy watchdog. With data predominantly coming from industry players without independent verification, strategic decisions tend to accommodate economic interests more than environmental sustainability goals. On the other hand, although data management infrastructure such as Command Centers and other digital platforms have been implemented, the lack of data integration and transparency adds to the complexity of multi-stakeholder governance. In this context, strategic measures designed to address information asymmetry become an essential element to ensure that the Citarum Harum Program becomes not only a symbol of ambitious policy, but also a model of inclusive, transparent, and accountable revitalization. By implementing a data-driven approach, strengthening cross-actor collaboration, and increasing community involvement, the program has the opportunity to achieve environmental sustainability targets while increasing public trust in the governance of the Citarum watershed.

Hidden Collusion in the Regulation of Citarum Harum Program

Collusion between regulators, the private sector, and local governments in the Citarum Harum Program reflects a major challenge in creating transparent and accountable governance (Dal Bó, 2006). Findings show that these cooperative relationships are often not transparent, creating inequities in resource allocation and decision-making. One of the main indications of this collusion is the allocation of projects that are dominated by certain actors, particularly large companies with strong political connections. Research (Erianti & Djelantik, 2019; Novalia et al., 2022) highlights that project sharing is often done through informal mechanisms that favor certain parties over meeting the needs of the community at large.

The budget allocated for industrial waste management in the Citarum Harum Program shows a significant imbalance compared to other sectors. Based on the Citarum Watershed Action Plan, the budget requirement for industrial waste management only reaches Rp1.6 trillion during the 2019-2025 period. This figure is much lower than the allocation for water resources management at Rp4.7 billion or waste management at Rp5.9 billion (Renaksi PPK DAS Citarum, 2019). This imbalance highlights the lack of policy alignment towards the issue that is the main cause of pollution, namely industrial waste. The following graphic shows the budget plan to solve the Citarum watershed problems from various aspects;

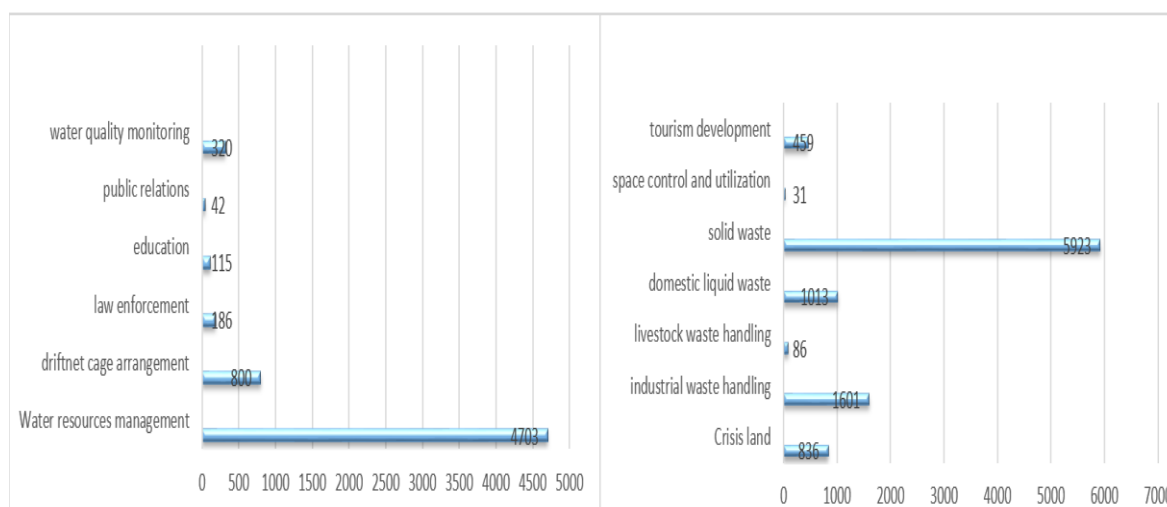


Figure 2. Budget Needs of Citarum Harum Program 2019-2025

Source: Renaksi, 2019-2025

Figure 2. shows the disproportionate budget distribution in the Citarum Harum Program, where industrial effluent management only receives around 10% of the total funding requirement of Rp1.6 trillion, while allocations for water resources and solid waste management reach Rp4.7 billion and Rp5.9 billion, respectively. This imbalance is all the more critical given that industrial waste, although only accounting for 30% of total pollutants, has a significant impact on chemical and biological pollution in the Citarum River. Data shows that the Citarum River holds more than 20,462 tons of organic and inorganic waste every day, including 35.5 tons of human waste, 56 tons of livestock waste, and medical waste, making it a giant uncontrolled waste dump.

Although 70% of pollution comes from domestic waste, industrial waste is a major threat that worsens water quality chemically with toxic substances and pollutant parameters, such as coli bacteria, that contaminate water to moderate to severe pollution based on the water quality index (Erianti & Djelantik, 2019). In this context, greater budget allocations for solid waste and water resources management can be understood as a response to the dominant contribution of domestic effluents. However, the minimal allocation for industrial effluents reflects a policy imbalance that pays little attention to pollution sources that require intensive and costly technical management. This suggests that policies do not fully consider the long-term environmental impacts, especially those resulting from non-degradable industrial effluents.

The dominance of the military in oversight structures also impacts decision-making patterns. In some cases, policies are geared more towards political stabilization than sustainable environmental management. Research (Mustofa et al., 2021) shows that this approach creates tension between central and local governments, which hinders the implementation of data-driven policies. Data from the Citarum Watershed Action Plan also shows that by 2022, as many as 60% of infrastructure projects will be managed by three large companies that dominate the waste management sector, with tender processes that lack transparency. Cimahi City, which is supposed to be a model of pentahelix governance, also faces similar obstacles due to the involvement of actors with strong historical ties, such as the military and industrial sector, which often prioritize short-term stability over program sustainability (Engkus et al., 2022; Erianti & Djelantik, 2019; Renaksi PPK DAS Citarum, 2019; Walhi Jawa Barat, 2024).

The lack of transparency in decision-making and budget management further increases the accountability gap in the Citarum Harum Program. Although platforms such as the Command Center have been designed to monitor the program digitally, the data provided is often limited and does not include important information such as budget allocations and independent audit results (citarum harum jabarprov, 2021; Detikjabar, 2022; Renaksi PPK DAS Citarum, 2019). This condition prevents the community from actively participating in monitoring program implementation and providing feedback on policy decisions. For example, while researchers found that the Command Center was designed to increase transparency through the integration of data from devices such as Onlimo and CCTV, the lack of real-time data updates reduces the effectiveness of this platform in supporting strategic decision-making (citarum harum jabarprov, 2021). The latest data on the water quality dashboard updated in 2024 shows a delay in the delivery of information to the public, making it difficult to monitor current conditions accurately.

This collusion also impacts the implementation of the inclusivity principle in the Citarum Harum Program, where local communities are often excluded from decision-making. This limited community participation creates inequalities that further exacerbate multi-stakeholder governance. In this context, the formal collaboration that should be the basis of the pentahelix approach is often disrupted by the dominance of certain actors who have greater access to information and resources. This suggests that the collusion dimension not only affects fairness in project allocation, but also creates inequalities in the implementation of policies designed to address pollution of the Citarum watershed.

Collusion in the Citarum Harum Program is a significant obstacle in achieving transparent, inclusive, and sustainable governance. The non-transparent relationship between regulators, local governments, and the private sector creates imbalances in project allocation and weakens policy accountability (Dal Bó, 2006). Based on the Regulatory Capture theory (Dal Bó, 2006), collusion occurs when the economic or political interests of certain actors dominate decision-making, so that policies are geared to serve certain groups rather than the public interest. Previous studies such as Rosana et al., (2013) and Mustofa et al., (2021) revealed that in collusive situations, the project procurement process is often carried out in an open administrative manner, but the timing of procurement publications tends to be abrupt, so that only certain actors who have early information are able to take advantage of the situation. This condition is exacerbated by the lack of independent oversight of the procurement process and project implementation. In this context, Bavinck et al., (2013) Good Governance concept emphasizes that transparency and public participation are two key elements that must be strengthened to ensure accountability in environmental governance.

In addition, the dominance of certain actors, such as the military and large companies, also exacerbates the imbalance in the decision-making process. A study by Ayyasy et al., (2021) shows that policies are often influenced by the interests of politically connected elites, leaving local communities with insufficient space to participate. This phenomenon is in line with the concept of “power imbalance” in governance, where unequal distribution of power creates barriers to inclusive participation (Hudson, 2020). In the Citarum Harum Program, this dominance is evident from the fact that most of the major projects were awarded to the same three companies over the past three years (Renaksi PPK DAS Citarum, 2019).

The lack of transparency in supervision is also an important aspect of the collusion dimension. Although the Command Center has been designed to digitally monitor program implementation, the data provided is still limited to general information and does not include independent audit results or detailed project allocations. This condition reduces public trust in the program, which in turn creates resistance to the policy (Novalia et al., 2022).

To overcome the collusion that occurs in the Citarum Harum Program, strategic steps are needed that are not only concept-based, but also implementable and address practical constraints in the field:

1. **Digital Transparency through Integrated Procurement System**
The project procurement system should be designed with an e-Government-based Digital Procurement Management approach. This process ensures that all stages, from planning to tender execution, are transparent and accessible to the public. Annual procurement roadmaps should be published a year in advance with quarterly updates. In addition, the use of blockchain technology allows all transactions to be permanently recorded and cannot be manipulated. All procurement documents are published on the Command Center platform, with real-time tracking of tender status. To maintain the integrity of the system, independent audits are conducted periodically by credible external institutions, such as NGOs or universities (Jopang et al., 2024). This approach not only increases transparency but also minimizes loopholes for collusive practices. Multi-Stakeholder Collaboration through "Citarum Sustainability Council" Forum
Cross-sector collaboration can be realized through the establishment of a regular forum involving regulators, the private sector, academics, local communities, and the media. The forum aims to discuss strategic issues such as budget allocation, project progress, and policy evaluation. Using Ansell & Gash, (2008) "Collaborative Governance Framework" approach (in Shimaoka & Sato, 2014), the forum ensures that all actors have an equal voice in the decision-making process. The results of these forum discussions must be published in the Command Center in the form of publicly accessible reports. This ensures transparency and accountability in multi-stakeholder collaboration.
2. **Participatory Oversight through a "Community-Based Audit" System"**
Community-based oversight is often a solution to fill gaps in government transparency (Jopang et al., 2024). This concept is relevant in the context of Citarum Harum Program management, where the involvement of local communities through community-based audits can improve accountability. The audit process is conducted by providing training to local communities to understand indicators of policy violations, as well as providing an e-governance-based digital reporting platform. This initiative will strengthen the relationship between the government and the community by creating a more transparent mechanism (Doshi & Schmidt, 2024; Novalia et al., 2022).
3. **Strict Law Enforcement with Transparent Mechanisms**
Strengthening regulation is done by establishing a special environmental court that handles violation cases in the Citarum watershed. All court decisions are openly published to increase transparency. In addition, a secure whistleblower system was introduced to protect whistleblowers from pressure or threats, while providing incentives for valid reports. This measure not only improves accountability but also encourages more rigorous and fair law enforcement.
4. **Local Community Empowerment through Incentives and Education**
Local communities are empowered through performance-based incentive programs. Communities active in environmental monitoring or conservation are given micro-grants to support their activities. Continuous education is also carried out through technology-based workshops and trainings to increase the community's capacity to understand environmental regulations and governance. This strategy is in line with the "soft governance" approach, which emphasizes the importance of transparency-based collaboration in improving the effectiveness of environmental governance. The program is managed by the Education Working Group of the Citarum Task Force, with the results of the program's impact published for public evaluation (Doshi & Schmidt, 2024; Jopang et al., 2024).
5. **Integration of Reward and Punishment Systems for Regulators and Contractors**

A reward system should be provided to contractors who complete projects according to schedule and budget without violations. Conversely, sanctions in the form of a ban on tendering for a certain period should be applied to contractors found to be involved in collusion or other violations. This system should be transparent and overseen by an independent body.

By integrating six key pillars—digital transparency, multi-stakeholder collaboration, participatory oversight, regulatory strengthening, local community empowerment and Integration of Reward and Punishment Systems for Regulators and Contractors, this model creates more equitable and sustainable governance. This reform is not just a technical approach, but a systemic transformation that is needed to ensure the long-term success of Citarum watershed revitalization.

Overall, the collusive dimension of the Citarum Harum Program reflects the fundamental challenge of creating transparent and inclusive governance. The lack of transparency in the relationship between regulators, the private sector, and local governments has created significant inequalities in resource distribution and project implementation. The dominance of certain actors, such as large companies with strong political connections, shows how collusion can undermine policy accountability and lower public trust in the program. Meanwhile, the lack of transparency in oversight and community engagement is a major barrier to creating equitable multi-stakeholder governance. By addressing these barriers through reforming procurement mechanisms, strengthening transparency, and optimizing public participation, the Citarum Harum Program has a great opportunity to become a model of sustainable environmental governance that is responsive to the needs of communities and the challenges of the Citarum watershed ecosystem.

CONCLUSION

This research reveals critical challenges in the governance of the Citarum Harum Program by examining the dimensions of Regulatory Capture—information asymmetry, collusion, and regulatory consequences. Unlike previous studies that primarily addressed narrow operational improvements such as wastewater treatment efficiency or waste collection processes, this study foregrounds the underlying power dynamics and selective regulatory enforcement mechanisms that fundamentally distort policy outcomes. The findings indicate that unequal access to verified data and collusive practices, particularly among several large industrial actors who are indicated to have political connections, lead to biased decision-making that marginalizes local communities. Moreover, despite formal environmental regulations, persistent domestic and industrial pollution suggests that current enforcement mechanisms fail to secure long-term accountability. Evidence points to phenomena such as silent deregulation—e.g., potential relaxation of wastewater treatment requirements—and poor inter-agency coordination, which collectively undermine policy effectiveness.

Furthermore, this study demonstrates that technocratic control through selective disclosure on public dashboards can create an illusion of transparency, thereby reinforcing the dominance of particular stakeholders. In this context, our research not only enriches the theoretical discourse on Regulatory Capture by linking these dynamics to environmental governance but also provides strategic recommendations focused on enhancing data integration, transparent monitoring, and inclusive oversight. Unlike traditional collaborative models that rely on hierarchical, top-down decision-making with limited stakeholder participation, the proposed Citarum Sustainable Governance Model (CSGM) offers a distinct framework. CSGM integrates digital transparency, independent auditing, participatory oversight, and multi-stakeholder collaboration to address both policy design and implementation

deficiencies. Notwithstanding these contributions, this study acknowledges limitations inherent in its reliance on secondary data and the dynamic nature of environmental policy. Future research should incorporate primary data to further validate and extend these findings.

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