



Collaborative Governance in Mitigating Environmental Health Impacts through Handling of ISPA in the Industrial Area

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Abstract

The rapid expansion of the nickel processing industry in Morowali Regency has intensified environmental degradation and contributed to increasing cases of Acute Respiratory Infection (ARI) among local communities. This study analyzes the implementation of collaborative governance in addressing the environmental health impacts of industrial pollution in Bahodopi District, Morowali. Using a qualitative case study approach, data were collected through in-depth interviews, direct observations, and documentation involving local government officials, health workers, corporate representatives, and community members. Data were analyzed using Ansell and Gash's (2008) collaborative governance framework. The findings indicate that cross-sectoral collaboration remains suboptimal across four dimensions. First, the starting conditions are characterized by power asymmetry, limited government environmental inspectors, and persistent public distrust toward corporations. Second, facilitative leadership is largely driven by local authorities and health facilities, while strategic corporate leaders are often absent from conflict mediation. Third, institutional design remains fragmented, as no permanent multi-stakeholder forum specifically addresses ARI mitigation despite established medical reporting mechanisms. Fourth, the collaborative process shows progress through digital medical records and emission monitoring but is constrained by limited real-time data sharing and weak shared understanding with affected communities. Corporate CSR initiatives are therefore perceived as insufficiently addressing the core pollution problem. The study recommends establishing a permanent integrated ARI task force, linking real-time emission monitoring with health early-warning systems, and redirecting CSR toward substantive emission-control improvements.

Introduction

Industrial and mining areas are indeed major drivers of the economy and creators of employment opportunities (Hilson & Garforth, 2013; Bansah et al., 2023; Hasan et al., 2024). However, continuous exploitation of natural resources often damages the environment and deteriorates the health of surrounding communities. Therefore, mining environmental management is very important and must be aligned with the principles of sustainable development (Meng et al., 2023). To address these complex environmental problems, the old style of governance that is rigid and only provides top-down commands is no longer adequate. A collaborative governance approach that involves dialogue and cooperation among all parties at every stage of mining has now become a necessity to maintain environmental sustainability (Novita, 2018). Cooperation across various sectors is urgently needed to protect nature for the welfare of present and future generations (Harahap et al., 2018).

For this cooperation to succeed, a well-functioning institutional system, openness in information sharing, and effective leadership are required to create innovative environmental solutions (Avoyan, 2022). In addition, changes in mindset and work culture within institutions are important so that development objectives can be achieved fairly (Wibawa & Nur'aini, 2020). This collaborative approach has proven capable of transforming a centralized decision-making system into one that embraces multiple stakeholders, while also empowering local communities (Prasetyo et al., 2025).

Openness and accountability are also key elements. For example, the use of digital monitoring technology and the establishment of joint supervisory councils, consisting of representatives from the government, companies, academics, NGOs, and citizens, are highly recommended so that environmental conservation programs do not merely become formalities on paper (Kurniawan et al., 2025).

Nevertheless, the implementation of collaborative governance still faces many obstacles. The main problems are conflicts of interest and sectoral egos between regions, which often worsen environmental degradation and trigger tensions within society (Liu et al., 2025; Praja et al., 2025). In addition, the policy of transferring mining supervision authority from local governments to the central government often weakens law enforcement in vulnerable areas. Therefore, supervisory authority needs to be returned to local governments along with the strengthening of local community capacity (Abd Ghafur et al., 2025). Another obstacle is overlapping legal regulations, which cause environmental restoration funds to become stalled in bureaucracy, while companies that violate regulations are not given strict sanctions (Kurniawan et al., 2025). Weak interregional coordination and the limited use of technology in local government also make this environmental cooperation system difficult to move quickly (Liu et al., 2025; Qiu et al., 2025; Liu et al., 2025).

At the community level, the active role of village governments and local residents is very important as the primary protectors of environmental sustainability. Solidarity between village officials, law enforcement officers, and residents is highly needed to prevent industrial practices that damage the environment (Marsa & Nasution, 2025). Unfortunately, the involvement of indigenous communities in environmental improvement efforts remains very limited (Wang et al., 2022). In fact, when residents and their customary values are genuinely involved, environmental management will become fairer and more independent (Urzedo et al., 2022). The state also needs to encourage residents to participate directly in monitoring and impose strict sanctions on companies that damage the environment. To date, compensation sanctions against companies are still rarely applied optimally, and communities themselves have not fully utilized collective legal action to demand freedom and justice for their living environment (Abas et al., 2025).

The very large nickel processing industry in Morowali Regency is currently creating serious problems that threaten public safety. The main problem is no longer merely environmental degradation, but severe air pollution that triggers a surge in people suffering from respiratory diseases or Acute Respiratory Infection (ARI). This condition appears to test the implementation of the latest environmental regulations in Indonesia, such as Government Regulation (PP) Number 22 of 2021. This regulation emphasizes that natural resources must not merely be exploited for profit, but must be managed fairly while considering environmental and community welfare (Rompas & Hayati, 2022). Therefore, the pollution problem in Morowali must be addressed comprehensively. We cannot simply punish parties that violate regulations. This resolution also requires cooperation among multiple parties, such as actively involving the community, providing alternative employment options, and providing health services and social assistance to prevent the spread of disease (Naulagan et al., 2025).

From various existing studies, one important issue that has been overlooked and needs to be studied immediately can be identified. So far, studies on cooperation among various parties (collaborative governance) in mining and industrial areas have focused more on waste management, post-mining land restoration (Mundzir et al., 2021; Syafaat et al., 2025), land disputes or illegal mining (Praja et al., 2025; Marsa & Nasution, 2025), and river restoration (Maulana et al., 2023; Liu et al., 2025). There are still few studies that specifically discuss how various parties work together to address an ongoing health crisis, such as the surge in ARI cases caused by factory pollution located very close to residential areas. ARI management cannot be carried out separately; for example, health workers only focus on treating patients, while environmental agencies only focus on measuring air quality. The two must be integrated. Unfortunately, studies that combine the role of health services (to treat) and corporate environmental supervision (to prevent) remain very limited (Olowoyo et al., 2024).

Therefore, this research is urgently needed to address this gap. The objective is to analyze and develop an effective cooperation system to reduce the number of ARI cases caused by pollution in the Morowali industrial area. This study examines four main aspects, namely the initial conditions of the parties involved, leadership capable of embracing all parties, the rules of the game (institutional design), and the collaborative process. By examining these four aspects, it is expected that a strong and flexible cooperation model can be created to address various problems (Ulibarri et al., 2023).

The results of this study are expected not only to contribute to scientific knowledge but also to provide concrete and applicable policy recommendations for the government, companies, and communities. Ultimately, the cooperation established is expected to make the region more resilient—that is, able to continue advancing the economy through investment without sacrificing the human rights and health of local residents.

Methods

The research approach used was a qualitative approach characterized by a natural setting as a source of direct and descriptive data. Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, J. W & Creswell, J. D, 2018). According to Creswell, qualitative research is a method for exploring and understanding the meanings attributed by a number of individuals or groups to social or humanitarian problems. This study used a qualitative approach with a case study design to deeply understand the operationalization of collaborative governance in mitigating environmental health impacts on ARI cases in the industrial area of Morowali Regency. A qualitative approach was selected because it is capable of exploring the meanings, perceptions, and dynamics of interactions among actors within complex social and ecological contexts, particularly in cross-sectoral synergy processes in hyper-industrialized areas. A case study was used because this research focuses on a specific locus with unique and contextual characteristics, allowing comprehensive and holistic exploration. The case study research method is one type of research that can address several issues or objects concerning a phenomenon, particularly in the social sciences (Yin, 2002).

The research was conducted in Bahodopi District, Morowali Regency, as the main study locus, which is currently the center of the nickel processing industrial area and simultaneously records the highest level of ARI vulnerability. The research subjects were determined purposively based on their relevance to the research focus, consisting of: 1) Local government (Head of Disease Prevention and Control Division of the Health Office, representative of the Regional Environmental Agency); 2) Doctors and Head of Bahodopi Community Health Center; 3)

Representative of the HSE Division of PT IMIP; 4) Head of Bahodopi District; 5) Local residents.

Data collection was conducted through several techniques to ensure the depth and validity of the information, namely:

In-depth interviews

Conducted semi-structurally to explore informants' perceptions, experiences, and responses concerning the dynamics of collaboration, conflicts of interest, and ARI mitigation measures.

Direct observation

Conducted to observe environmental monitoring practices, public services in health facilities, interactions among institutions, and air quality conditions around the industrial area.

Documentation

Collected secondary data in the form of regional regulatory documents, epidemiological medical record reports from the Community Health Center, company environmental reporting documents (RKL-RPL), and other relevant data.

Data analysis was conducted interactively by referring to the Miles and Huberman (2014) model, which consists of three main stages, namely data reduction, data display, and conclusion drawing/verification. The analysis process was conducted iteratively from the data collection stage through the interpretation of results.

To strengthen the analysis, this study used the conceptual framework of collaborative governance developed by Ansell and Gash (2008) as the main analytical tool. The data obtained were categorized and analyzed into four dimensions, namely:

Starting Conditions

Including resource asymmetry, history of cooperation or conflict, and the initial level of trust among government, private-sector, and community actors.

Facilitative Leadership

Including the role of mediation, empowerment of weaker actors (the community), and institutional firmness in leading collaboration.

Institutional Design

Including clarity of the rules of the game, transparency, and the availability of inclusive forums or participatory spaces for formulating environmental policies.

Collaborative Process

Including the dynamics of face-to-face dialogue, trust building, commitment to the process, and shared understanding in addressing industrial pollution.

The analysis also emphasized the interactive relationships among the four dimensions to identify patterns of integration, obstacles or sectoral egos, and their implications for the effectiveness of ARI mitigation in Morowali Regency.

To ensure data validity, this study used several validation techniques, namely:

Source and method triangulation, by comparing data from various informants (government, corporations, medical personnel, and communities) and data collection techniques.

Member checking, by reconfirming the interview results with informants to ensure the accuracy of the interpretation.

Audit trail, by systematically documenting the entire research process.

Peer debriefing, through discussions with fellow researchers or academics to obtain critical feedback on the analysis results.

Results and Discussion

Starting Conditions Dimension

Starting conditions constitute the most fundamental foundation in establishing collaborative governance. This stage largely determines whether cooperation among parties can proceed fairly, equally, and bring tangible benefits. In the case of health management in the industrial area of Morowali Regency, this initial foundation was characterized by a striking imbalance of power, as well as an extremely heavy environmental burden on local residents. The sharp increase in Acute Respiratory Infection (ARI) sufferers in the area cannot be viewed merely as an ordinary disease outbreak. It is a consequence of disorganized spatial planning and an uncontrolled population explosion.

The operation of large-scale nickel processing factories has attracted thousands of workers from outside the region. As a result, new settlements have emerged that are over capacity. For example, a small 4×4 meter boarding room often has to accommodate six to eight workers. Air circulation in these residences is very poor, compounded by their direct proximity to factory smokestacks. Such micro-environmental conditions provide highly favorable conditions for the spread of bacteria and exposure to pollution toxins. Tragically, such an enormous population and pollution burden must be faced by a local government whose capacity is very limited. The Regional Environmental Agency (DLHD) of Morowali Regency, which should serve as the frontline environmental monitoring institution, is experiencing a severe shortage of personnel. It has only five field inspectors, a number that is highly inadequate for monitoring an industrial area whose size continues to expand over time. In the medical service sector, the situation is equally concerning. Bahodopi Community Health Center and other health facilities are overwhelmed by the continuously increasing queues of ARI patients, while the number of available doctors is very limited.

In addition to the shortage of personnel, collaborative efforts are also hindered by the damaged trust between local communities and companies. This latent conflict has existed for a long time. Indigenous residents who have lived in the area for decades have now become the most disadvantaged party. Every day, they have to inhale air with a strong ammonia odor and clean chemical dust that is so hazardous that it can damage the roofs of their houses. All complaints and protests from residents have so far failed to produce tangible environmental improvements. This has generated accumulated disappointment and developed into suspicion that residents are deliberately being gradually forced out.

The destruction of this foundation of trust was clearly confirmed through a statement from a representative of the local indigenous community:

"We have often complained to the company, reported to the council, and even the government has mediated, but unfortunately until now there has been no follow-up or tangible result... It has become so severe that sometimes we even suspect that perhaps this pollution is deliberately allowed to spread downward so that people feel uncomfortable and eventually leave on their own without the company having to think about its relocation obligations."

This statement provides clear evidence that residents actually feel afraid that they are being subtly forced to relocate because their environment has become uninhabitable due to pollution. Since the community has been suspicious from the beginning, efforts to establish cooperation

in Morowali are certainly very difficult. The loss of mutual trust is the greatest social obstacle that must first be resolved. If this issue of trust remains unresolved, cooperation to address the health problems there will never be able to function properly.

Facilitative Leadership Dimension

In cooperation involving many parties, the presence of a leader capable of embracing everyone (facilitative leadership) is absolutely essential. Such a leader is responsible for mediating conflicts, reconciling differences, and ensuring that weaker parties remain protected. However, field findings reveal an unusual situation. The initiative to take action to protect residents did not come from senior executives of major industrial companies, but rather from the courage and innovation of lower-level government officials at the subdistrict and community health center levels.

The subdistrict government demonstrated an exceptionally rapid and courageous response. They went directly into the streets to resolve problems in front of them, demonstrating the high level of local government participation in addressing the crisis. This firmness was directly described by the Secretary of Bahodopi District:

"I often directly reprimand parents riding motorcycles with their children and allowing their children not to wear masks amid such thick dust. Yesterday, we from the subdistrict government went to the site and disciplined company vehicles that were parking carelessly along the roadside because they did not have a designated parking area. The point is, we never remain silent."

In the health sector, the Community Health Center also refused to simply sit and wait for patients to come for treatment. They changed their approach to become more proactive by launching the Free Health Check (CKG) program. Community Health Center personnel conducted outreach by directly visiting places where workers and vulnerable residents gathered. At a higher level, the District Health Office also succeeded in involving the private sector, such as PT Vale, to fund the Simultaneous ARI Education Movement (GESER ISPA) program through corporate social responsibility (CSR) funds.

Unfortunately, the efforts of government officials were met with a passive and seemingly evasive attitude from the main company responsible for the pollution. The community considered that the company had failed to demonstrate good leadership. Whenever meetings were held to resolve pollution conflicts, the company deliberately failed to send senior officials with decision-making authority. This disappointment was clearly reflected in the testimony of a local resident:

"The main problem is that whenever there is a meeting, the company never brings its leaders or the main person responsible. They only send subordinates or public relations staff whose positions do not involve policymaking. So, when we demand accountability, the representatives cannot provide an answer. In the end, the standard response is always, 'I will convey it to the leadership.'"

The absence of the company's senior leadership from negotiation meetings made residents feel disregarded. For residents, this became strong evidence that the company's intention to resolve the environmental crisis was merely an empty promise, without genuine willingness to take responsibility.

Institutional Design Dimension

Institutional design concerns how the "rules of the game" are established. This includes legal regulations, reporting procedures, and official forums where all parties can meet and discuss

issues. When examining the institutional design in Morowali Regency, it was found that reporting procedures at the lower level were implemented in a disciplined and strict manner, but the local government had failed to establish a single dedicated forum to bring all parties together regularly.

The greatest weakness at present is the absence of a permanent discussion forum or special team established to address the ARI crisis surrounding the industrial area. Discussions concerning the ARI outbreak have never had their own dedicated space; the issue only becomes a topic occasionally when government agencies hold general meetings. This fact was confirmed by the Head of the Disease Prevention and Control Division of the Health Office:

"If we are talking about a meeting forum, honestly, until now there has indeed been no routine forum specifically established for ARI mitigation and management. Even so, the issue has not been neglected. Whenever there is a meeting discussing environmental quality, the issue of ARI management is always included."

The absence of a dedicated forum indicates that pollution and ARI management have not yet been regarded as an emergency requiring all agencies to regularly sit together. Nevertheless, the technical regulatory system in the field deserves recognition. In the health service sector, the Community Health Center applies strict mandatory reporting regulations to all clinics within its area. The Head of Bahodopi Community Health Center explained the regulation:

"Currently, our service network covers Auxiliary Community Health Centers (Pustu), 6 registered private/company clinics, and more than 70 independent medical practices. Each of these health facilities is required to submit three types of routine reports no later than the 25th of every month, with a mapping of the 10 most common diseases, including ARI cases."

Meanwhile, for environmental monitoring, large companies such as PT IMIP are required by regulation to submit environmental management reports every six months. The factory smoke monitoring equipment (Continuous Emission Monitoring System/CEMS) is also required to remain operational, with its data directly connected to the central government's computers in real time. At the village level, the subdistrict provides considerable flexibility in regulations, allowing Village Funds (APBDesa) to be used flexibly to assist residents who become ill due to industrial pollution.

Collaborative Process Dimension: Successful Digital Innovation, but Failure to Understand Residents

The collaborative process focuses on how smoothly communication operates, how agencies exchange data with one another, and whether all parties can reach a shared and satisfactory understanding. In Morowali Regency, this collaborative process has advanced considerably in terms of technology use within the Community Health Center, but remains very poor in terms of communication among government agencies and communication with village residents.

The most notable change can be seen in the successful integration of people, machines, and organizations within health facilities. Doctors at the Community Health Center no longer work manually. They use Electronic Medical Record (EMR) application technology, which makes the diagnosis of lung and respiratory diseases highly accurate. The doctor at Bahodopi Community Health Center explained the major impact of this technology:

"In the digital medical record system that we currently use, the general diagnosis of ARI is no longer established; instead, it directly refers to specific types of diseases, ranging from flu, cough, throat infection (acute pharyngitis), and tonsil infection (acute tonsillitis), whose data are automatically recorded."

Unfortunately, the sophistication of automated data at the Community Health Center cannot be utilized by other agencies because government communication remains rigid and operates separately. The Environmental Agency, which holds data on deteriorating air quality, rarely matches its data with patient data held by the Health Office. They only exchange data when a third party, such as Bappelitbangda, organizes a meeting to bring them together. The poor communication between agencies was honestly acknowledged by the Head of the Disease Prevention and Control Division of the Health Office:

"If we were to put it into a percentage, honestly, our level of cooperation with other sectors is currently still below 50%. Often, we only discover that there are activities that support one another across sectors when we sit together in one meeting. Because it has not been properly organized, each sector ultimately still tends to operate independently."

Even worse, the company's efforts to establish communication and gain the trust of residents were considered to have completely failed to address the root of the community's problems. The company did distribute tens of thousands of masks and provided free medical treatment through CSR funds, but in the eyes of residents, all of these efforts were merely formalities to make the company appear concerned. Residents felt that the distribution of masks was completely disproportionate to the damage to their respiratory systems over the long term, as well as the loss of their livelihoods due to the severely damaged sea and air.

The failure to genuinely listen to the community's suffering ultimately triggered even greater anger. Because they felt that the solutions offered were merely superficial, residents have begun making more substantial demands, ranging from requesting regular monthly cash compensation to urging that entire villages be relocated and moved to safe areas using company funds. This serves as clear evidence that collaboration has not yet produced a compromise capable of reducing the crisis.

The research findings in the industrial area of Morowali Regency show that the management of ARI has not been implemented optimally because cross-sectoral cooperation has not operated in a balanced manner. The health crisis caused by pollution cannot be resolved merely by adding medical facilities. This problem requires genuine cooperation among the government, companies, and communities. The stagnation in ARI management in Morowali is rooted in weak cohesion across four main components of collaborative governance.

Power Imbalance and Loss of Trust at the Initial Stage

At the initial stage, the greatest obstacles were the shortage of government environmental inspectors and the loss of community trust in companies. This is consistent with the view of Ulibarri et al. (2023) that environmental collaboration requires balanced responsibility and roles. Corporate dominance and residents' complaints being ignored for years have made residents suspicious and increasingly distrustful. If cooperation is imposed under unequal and distrustful conditions, the result will only become a formality on paper. This finding also supports the view of Urzedo et al. (2022) that without the involvement of local communities, environmental justice cannot be achieved. Cooperation loses its meaning when equality does not exist from the outset.

Leaders Who Fail to Embrace All Parties and the Absence of a Discussion Forum

In terms of the rules of the game, cooperation reaches an impasse because there is no regular forum specifically dedicated to discussing ARI, compounded by the rare attendance of senior company officials during mediation. According to Ansell and Gash (2008), official forums and leaders who are willing to embrace all parties are essential for creating solutions. This finding

reinforces the proposal of Kurniawan et al. (2025) that an official joint supervisory council needs to be established so that corporate commitment does not stop at promises made by public relations staff. Although health workers in the area have been highly proactive in implementing outreach programs, without an official joint forum, these efforts remain weak and operate separately. The obstacle caused by sectoral egos is what Liu et al. (2025) highlights as a major factor undermining collaboration.

Process Challenges: Digitally Advanced, but Failing to Understand Residents

In the working process, the use of technologies such as digital medical records at the Community Health Center and pollution monitoring equipment at factories has succeeded in making data more accurate. Unfortunately, pollution data from the Environmental Agency are not automatically shared with the Health Office. In addition, this collaboration has failed to establish a shared understanding between companies and residents. Residents feel that simply being provided with masks through CSR programs does not address the root cause of toxic air. This is consistent with the view of Prasetyo et al. (2025) that CSR assistance should not merely involve distributing goods, but should genuinely improve conditions fairly.

These problems emphasize that the main obstacle to ARI management in Morowali is not its medical technology, but rather its disorganized collaborative system. Therefore, a more comprehensive approach is required (Prajā et al., 2025), with a focus on improving discussion forums, ensuring genuine corporate commitment, and restoring community trust.

Conclusion

This study aimed to examine how collaborative governance or cooperation among various parties operates in addressing respiratory disease (ARI) problems caused by pollution in the industrial area of Morowali Regency. Overall, it can be concluded that this cooperation has not operated optimally due to unequal roles among the parties and mitigation measures that have not been fully integrated.

This imbalance is clearly evident in several aspects in the field. At the initial stage, the number of environmental inspectors was found to be very limited compared with the rapid expansion of factories. This problem was further exacerbated because surrounding residents had lost trust as a result of their environmental complaints often being ignored by the companies. In terms of leadership, health service providers such as the Community Health Center and Health Office have actually been very active in directly reaching out to residents, but unfortunately, senior company officials with decision-making authority rarely attend problem-solving forums. In addition, although the patient data collection system in private clinics has been properly implemented, no official team or forum has been established specifically to jointly discuss the ARI crisis. Consequently, although medical record systems and factory pollution monitoring equipment are digitally sophisticated, the relevant government agencies have not yet been able to exchange data rapidly and directly in real time. These series of weaknesses have caused the distribution of masks through company CSR programs to be considered by residents as failing to address the root of the problem and instead triggering residents to demand that their settlements be relocated.

Based on these findings, this study provides an important lesson that cross-sectoral cooperation will never succeed if there is an imbalance of power and a loss of mutual trust within the community. In addition, health crises caused by pollution cannot be resolved merely by treating patients in health facilities, but must also be prevented through strict and transparent environmental monitoring. Therefore, local governments are strongly encouraged to immediately establish a permanent ARI Task Force that must involve representatives of government agencies, residents, and the highest-level company leadership so that its decisions

are binding. In addition, air quality data from factory smokestacks should be directly connected to warning displays at Community Health Centers, and companies should change the form of their CSR programs from merely distributing medical assistance to genuine efforts to improve factory smoke filtration technology.

Nevertheless, this study also has several limitations. The focus of this study was only on the industrial epicenter of Bahodopi District, so the results may differ if compared with industrial areas in other regions. In addition, this research approach primarily examined relationships among parties and did not measure the impact of pollution using mathematical calculations. Therefore, future research is recommended to compare Morowali with other industrial areas to examine variations in forms of cooperation. Future research should also use quantitative methods involving precise numerical measurements to determine whether factories that comply with air-quality regulations are actually associated with a reduction in the number of ARI sufferers in their surrounding areas.

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