

Eroding the Ethics: Resource Extraction, Water Infrastructure, and Insecure Farmers in Indonesia

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This article examines the effects of coal-mining water infrastructure on the waterscape, farmers' practices, and ethics in East Kalimantan, Indonesia. Focusing on the Pond, a water infrastructure built by a coal mining company, the study reveals its contradictory effects on the local waterscape. Rather than effectively managing wastewater, the Pond produces inconsistent water supply. It generates conflict between farmers and the mining company, creating unequal relationships and increasing vulnerability and dependence. Ecological changes and water uncertainties compel farmers to alter their pest-control practices, compromising their ethic of *sama-sama cari makan* ("foraging together," or "surviving together"). Closely connected with Islamic values and local mythology, this ethic promotes thoughtful pest-control practices as it recognizes the existence of pests as rightfully equal to humans in the farm ecosystem. This ethic of relatedness is possible through and within watery connections. This article highlights forms of slow violence, showing how the Pond, as extractive infrastructure, disrupts the waterscape, generates insecurities, and erodes ethics. In a broader context, it explores human-water relationships amid large-scale resource extraction and development in Indonesia.

Keywords: wastewater treatment, pest control, infrastructural violence, multispecies ethics, coal mining

1 Introduction

This article depicts how one coal mining company's water infrastructure—the Pond—affects the waterscape, local farmers, and ethics in East Kalimantan, Indonesia. The waterscape transformation generates a sense of insecurity in farmers and compels them to alter their pest-control practices, which contributes to the erosion of their ethic of *sama-sama cari makan* ("foraging together," or "surviving together"). Focusing on the materiality of water and the concept of infrastructural violence, this study

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is a micro-perspective within a broader discussion of resource extraction, infrastructure, and their relevance to violence and ethics in Indonesia.

Studies have shown that the resource extractive industry in Indonesia and other Southeast Asian countries is part of the state's ideology of development, progress, and modernity (Robinson 1986; Hirsch and Warren 2002; Nevins and Peluso 2008). The resource extractive industry entails massive development, as its activities would not be possible without infrastructure and technology (Ferry 2022; Nuttall 2022). A study on International Nickel Company's mining operations in Soroako, Indonesia, showed that the company commissioned stages of expansive infrastructure construction projects. The company claimed that infrastructure development would bring development and economic growth to Soroako, but instead the projects had a negative impact on local residents. The mining infrastructure projects not only reordered local relationships with the environment and diminished local livelihoods but also affirmed the mining company's role in local development, making local Soroakans "the stepchildren of progress" (Robinson 1986).

Between 2001 and 2007, Newmont Mining Corporation was expected to provide local public infrastructure in Sumbawa Regency. Mining company-built infrastructure represented the modernization and development of isolated and left-behind villages and positioned the company as a patron in villagers' everyday lives (Welker 2014). However, locals also experienced direct negative impacts from the large-scale resource extraction through the mining company's infrastructure. Kathryn Robinson (1986) and Marina Welker (2014) both reported that mining company infrastructure—such as roads, townsite sewage, tailings disposal pipelines, dams, and channels—had profound impacts on rivers and water, affecting local livelihoods and welfare.

Water has always been the focal issue of resource extraction controversies (Kirsch 2014; Li 2015; 2016; Li and Velásquez 2022). Rivers and water have consistently been among the ecosystems most impacted by mining activity across the Indonesian archipelago (McMahon *et al.* 2000; Ballard 2001). Historically, rivers in Indonesia have been polluted by waste due to rapid industrialization. Pollution has made rivers a political subject in the Indonesian environmental discourse, given that its main causes are corporate infrastructural and technological failures as well as weak enforcement of state regulations (Lucas 1998). In East Kalimantan, the political ecology issues of polluted rivers and communities' limited access to clean water are closely linked with racial discourse, company patronage, and weak or corrupt local institutions, all of which are contributing factors to community water vulnerability and health problems (Kunanayagam and Young 2002).

While previous studies on resource extraction have focused mainly on the politi-

cal ecology dimension of the environment and livelihoods, this article focuses on the materiality of water and infrastructure as inherent parts of the resource-extractive landscape. This study aims to understand the human-water relationship by “thinking with water” (Chen *et al.* 2013) through the relationship between infrastructure, water, and ethics. It aims to add further understanding of how the materiality of infrastructure and water correlates with the critical issues of environment, violence, and ethics (Nixon 2011; Rodgers and O’Neill 2012; Enns and Sneyd 2020; Acuña and Tironi 2022). For example, in East Kalimantan the urbanization of the Sepaku River for Indonesia’s new capital city has produced multiple forms of violence against Indigenous people through state-led water infrastructure projects (Swara *et al.* 2025). Studies in Vietnam also show that forms of slow violence occur in state-driven infrastructural projects, which is not an obvious impact, not directly observable, and dispersed across time and space (Nixon 2011; Turner 2022; Michaud and Bilodeau 2024).

Referring to Tania Li’s work, the term “erosion” in this article is used to describe changes that occur “not dramatically, but piecemeal and by stealth, rather like the action of water on a stream bed that creates new pathways and makes old ones unusable or irrelevant, without anyone willing it to be so” (Li 2014, 116). Erosion aligns with Rob Nixon’s concept of “slow violence” (Nixon 2011, 2). Therefore, in the growth of extractive development in the Southeast Asia region—whether through mining, large-scale plantation, or massive hydroelectric projects—it is critical to focus on the issues of violence and ethics in the relationship between infrastructure and water. Thinking with water and examining the complex relationship between resource extraction, infrastructure, and the local community is to “unveil violence by revealing the differing ways that what counts as ethical and responsible is understood by those who live with violence directly and daily” (Chao 2024, 69).

Hence, I focus on two questions. First, how does the Pond—initially intended to treat wastewater—affect the waterscape? Second, how does infrastructural violence from the Pond manifest? To answer these two questions, I conducted research in Segadur, Kutai Timur, East Kalimantan, from September 2022 to August 2025. I interviewed 35 people, mostly farmers, field officers, company representatives, and local NGO activists. Through multiple visits, I observed and participated with the farmers on their farms and gardens and followed them in their daily lives. I also participated in farmers’ gatherings, took part in company-sponsored trainings, held meetings with company representatives and activists, and attended events at the research site. Together with the farmers, in late 2024 we conducted a qualitative survey with 47 respondents. The survey was aimed at obtaining farmers’ perspectives on water, their experience, and their knowledge and practice of water. In May 2025 we sampled the

water in five different sampling sites in Segadur and brought the samples to the Sucofindo laboratory in Kutai Timur to be analyzed for key parameters in mining and agriculture, such as levels of acidity (pH), turbidity (TSS), iron (Fe), and phosphate (P). I also gathered copies of documents—with consent—from the farmers' association, the coal mining company, government officials, and local activists related to agriculture, coal mining, and water issues. For safety and ethical reasons, pseudonyms are used for all interlocutors in this article.

The discussion will be divided into three sections. The first section discusses the Pond, whose presence is changing the Segadur waterscape and farmers' relationship with water. The second section tells the story of the farmers' struggle and their experience of water insecurity as the Pond increases their water vulnerability and dependency. The third section elaborates on the farmers' ethical knowledge and practices, and how the effects of the Pond in transforming the waterscape lead farmers to use excessive pesticides that contravene local pest-control habits, thus eroding the *sama-sama cari makan* ethic.

2 The Pond and the Changing Waterscape

One afternoon in early August 2023, Baba, one of the Segadur farmers, took me for a ride on his motorbike to see the Pond. The Pond is located in a valley across from his house. "You can see everything from that spot. The mining pit and the Pond are on one expanse of landscape," Baba said in response to my question on whether we could see anything from that particular spot. As we rode uphill on the gravel road, Baba continued:

If you think about it, what has changed is our natural environment. After the mine, there is less water . . . some rivers are dead, not flowing, and some are declining. We can only complain to ourselves. We are confused. Where else can you complain? When we talk to the company, they are also confused. They say, "We will check it out." That is all they can say.

Once we arrived, we observed from a distance the coal mining operation as it unfolded. In the background, massive dump trucks were carrying loads down the dusty mining road. Some were hauling and dumping earth materials into a dumping area near the Pond, forming huge piles of grayish material. In front of us, just by the dumping area, was where the Pond was located. The Pond consists of several interconnecting infrastructures: a detention pond, a labyrinth-shaped pond, an embankment, a spill-

way, water gates, access roads, and a security guard post. On one corner near the embankment, we could see a pile of empty sacks that seemed to have contained a chemical substance for water treatment. Pointing to the horizon, Baba commented:

Before the Pond existed, there were many kinds of farms and gardens here; there was a water-melon orchard there, and a rice field next to it. Banana gardens and a hut used to exist in the middle of the Pond. But all is gone now.

Baba and others near the Pond are among the many farmers who reside in the vicinity of the PT Kalim Prima Coal (KPC) mining operation in East Kalimantan. KPC is arguably one of the largest coal mining companies in the world, having produced 53.46 million tons of coal in 2023 (KPC 2024). It holds 61,543 hectares of mining concession, spanning three subdistricts in Kutai Timur, East Kalimantan, including Bengalon Subdistrict (KPC 2024). KPC's Bengalon coal project comprises 19,227 hectares of mining area with an additional infrastructure zone for hauling road, stockpiling, ship loading, and marine facilities (KPC 2022). Not the entire area is mined. Some sections are allocated for infrastructure to manage wastewater.

Water management is critical for mining operations. KPC's coal mining projects in Bengalon are located at the watershed along the Bengalon River and its tributaries. The extraction sites are connected and linked to the river as water from them flows in and out to the water bodies in Bengalon. According to Indonesian law, all resource extraction corporations must follow mandatory environmental regulatory laws on wastewater management.¹⁾ Water discharged from industrial and mining activities must comply with the regulatory threshold, or *baku mutu*.

To comply with regulations and achieve *baku mutu*, KPC has built water infrastructure in the form of settling ponds. The company applies hydrological principles to construct its ponds and conduct technical services, such as regular pumping, dredging, and applying chemicals for water treatment, ensuring that the water quality and quantity meet the *baku mutu* threshold before being discharged into rivers or creeks. The outlets of the settling pond also serve as official compliance points. According to a KPC official, 11 compliance points, including the Pond, are directly connected to rivers or creeks flowing through villages in Bengalon.²⁾

KPC managers believe that their settling ponds improve water quality and control floods, benefiting both the environment and society. For example, one manager shared that a KPC settling pond increased the water's pH level from 4–5 to 6–7.³⁾ Komar, another manager, said that before the Pond project was started, he convinced the village head that it would improve water quality by diminishing *air bangar* (foul,

red-colored water) from the Segadur Creek wetland. “That is why the village head supported the Pond construction,” he revealed.

The Pond, built in 2020, functions to manage wastewater and control the water volume from one of KPC’s mining pits. Nearby residents and local farmers said that the effect of the Pond has been felt since its construction phase. During this phase, the water flow from the Pond construction site to Segadur Creek and irrigation canals was murky and sometimes overtopped nearby farms. The problem settled once the Pond started to operate, and KPC provided a drilled well for nearby residents and initiated development projects to support local farmers. Farmers in Segadur depend on the Pond to irrigate their farms and gardens, as it has become their main water source. KPC promoted the Pond as a showcase of its Corporate Social Responsibility and Good Mining Practice. In 2021 and 2022, KPC received the Indonesia SDGs Award and the Indonesian Subroto Award for integrating the Pond with local agriculture development (Srivastava 2021; 2022a; 2022b). However, the Pond also has contrary effects on the waterscape, impacting existing water infrastructure and other farm plots.

Baba took me to the road across from the Pond, where he showed me water channels and culverts that had dried out. The channels and culverts had been constructed by the government in 2016 to irrigate rice fields and were originally connected to a stream that flowed from Segadur Creek. However, after the Pond began operating in 2020, the water that used to fill the channels ran low. Around ten hectares of rice fields were abandoned due to a shortage of water.

Accounts of waterscape transformation were shared also by other farmers. For example, one elderly rice farmer said that Segadur Creek used to have more branches running downstream but now has only two. That is why, according to another farmer, seasonal flooding has been rare since the Pond was constructed. He said, “It [Segadur Creek] used to flood three times annually, but now that is rare. I am lucky because my cattle pen is free from flooding, but for the farmers downstream, I think they are lacking water.”

Izhar, a rice and vegetable farmer downstream, believes that the Pond has shortened the headwaters of Segadur Creek. He said, “Now it takes only twenty days of the dry season for the creek to dry. Before [the Pond], it took three months!”

Thus, in plots where water is scarce, farmers like Baba and Izhar must switch from rice to seasonal crops that use less water and have shorter cultivation periods. The story of the changing waterscape shows how the Pond is driving a transformation that extends beyond its boundaries, past resource extraction (Nuttall 2022, 67) to a transformation of surrounding land and livelihoods through watery connections. From its inception, the Pond has demonstrated the complex entanglement between water,

infrastructure, and society. It symbolizes the modernization ideology by applying techno-science to impose governance and control over water and nature. Its capacious agency is enabled by its technological and scientific dimensions and material and political presence (Bijker 2007; 2012; Bakker 2012; Barnes 2012; Barnes and Alatout 2012; Ferry 2022; Nuttall 2022).

According to Fabiana Li and Teresa Velásquez, “Water infrastructures encompass the material, social, and political relations that organize mining-related conflicts” (Li and Velásquez 2022, 207). Therefore, the Pond’s presence in Segadur’s waterscape is political and not neutral. It creates disjuncture and generates tensions and conflict within a “political field of negotiation” (Stensrud 2016) as actors contest the meaning of water, challenge governance, and compete for access (Li 2016; Yates *et al.* 2017). The next section elaborates on the farmers’ struggle over water and their experience of water insecurity and vulnerability as their livelihoods are entangled with the technopolitics of the Pond, which shape desires, feelings, and the future (Larkin 2013).

3 Struggling over Water Insecurity and Future Water Uncertainty

The word *segadur* derives from the word *gadur*, meaning “earthenware water basin.” The prefix *se~* in *segadur* denotes a volumetric measurement of water equal to one *gadur*. Thus, *segadur* serves as a metaphor for the geological nature of the place: a place that contains water. Segadur is located within the Bengalon River floodplain, where tributaries such as Segadur Creek flow into the Bengalon River and which was once a site for slash-and-burn rotational cultivation by the Kutai and Basap people. However, today the word *segadur* is used by locals to refer either to the *lokalisasi* (red-light district) or to a farm area located just behind the bars and nightclubs.

Intensive water-irrigated agriculture in Segadur began in the late 1990s as a community development initiative by the local government and KPC to improve local food production. Yana, a veteran agricultural field officer, said not many farmers were intensively cultivating the land as it was frequently flooded. In 2015 a central government project supported by KPC was initiated to construct water-intensive rice fields, including irrigation canals, which Baba showed me. The development project also promoted agricultural inputs to intensify production, including high-yielding hybrid seeds, fertilizer, agricultural lime, and pesticides. More farmers began to cultivate the land and expand their plots, even in the marsh near the Bengalon River. The river and the Segadur waterscape became a critical part of the local farming economy, intertwined with development projects and mining activity. After the Pond’s construction

began, however, the Segadur farmers began to feel insecure as the project had profound effects on the Segadur waterscape.

In October 2022 a few farmers noticed a change in the quality of the water flowing from the Pond. The water was murky. It was unsuitable for irrigating their crops, let alone for their daily household needs. Residents and farmers began to take water samples from their water channels to KPC as proof. The farmers communicated the situation informally to KPC, but that had little effect. So on February 3, 2023, the farmers filed a formal petition to KPC asking for a solution, a way in which they could both win. In their petition, they included photos of water samples taken from different locations from November 2022 to January 2023, showing thick brown water. Based on the farmers' report, there were seven groups of farmers, and around 120 hectares of farmland were affected by the Pond.

At a meeting on February 8, 2023, the farmers presented their case by describing the impact of the water on their crops and cattle, using affective expressions such as “my water spinach has gone curly,” or “even the cow refuses to drink the water.” One farmer-resident said, “The water makes my skin itchy, stunts my fish, and causes the rice paddy to hollow.” However, KPC stood by its claim that the water quality was within the *baku mutu* and that it was a consequence of maintaining the Pond. Komar described it as “just like cleaning our bathtub.” However, the analogy of “cleaning our bathtub” is a simplification of a rather complex process.

Nicholas, a KPC manager, stated that settling pond maintenance was part of KPC's water management system. KPC applies a 60 percent sedimentation level as a critical threshold for all settling ponds—meaning that regular pond services are carried out to keep the sedimentation level under 60 percent, ensuring the pond's capacity to treat wastewater, which includes dredging, pumping, and applying aluminum sulfate and hydrated lime. However, during the Pond's maintenance in 2022, Komar admitted that the company had not expected the Pond to release water that still carried a high residue of silt and lime to Segadur Creek. Hence, he continued, “Internally, we pressured the operation [to solve the issue], which led them to pump back the water to the mine.”

After prolonged disputes and negotiations, on September 26, 2023, KPC disbursed 205.4 million rupiah (around USD 12,638) to the village office to support agricultural inputs for the farmers to resolve the Pond water issue. The farmers understood that the true objective was to settle the water issue that they had experienced for the past couple of months. A KPC official explained the reason behind the water-related development support: “It is impossible to compensate for their loss, so we give them support [money] for seeds, for fertilizer, and to build wells.” He believed the support money was a win-win solution for both parties, as “their [farmers'] claim related to

the water and its impact cannot be scientifically proven.” For farmers like Baba, the support money felt more like a loss than a victory. He felt that the root cause had still not been addressed. Expressing his despair, he said, “I understand they gave us compensation money and three units of wells; it was OK for the residents . . . to keep our mouths shut. But for the farmers, who need a lot of water, to whom should we shout for help?”

Baba’s concern was certainly justified. On November 16, 2023, Forum Pemerhati Masyarakat Pesisir Kutai Timur (East Kutai Coastal Community Monitoring Forum, or Fopsir), a local NGO, submitted a report to KPC showing water pollution in the residential and farming areas, allegedly caused by high sedimentation from the Pond (FOPSIR 2023). Fopsir activists told me that this had been reported to the Kutai Timur Environmental Agency, but there was little that could be done by the agency. One of the activists explained:

Cases concerning rivers and water like these are difficult. The objective condition of the water is fluctuating and uncertain. It can be changed in a matter of days [by the company]. That’s why the head of the agency said to us, “If you cannot present a real-time case backed with consistent scientific data, there is nothing that we can do.”⁴⁾

In early 2024, residential areas near Segadur and plots of rice fields were damaged by flash floods. But in February 2024, farmers in Segadur started to experience water scarcity. “The water level in the irrigation canal is usually around 70–80 cm, but now it is only 40–50 cm. Rice fields are drying, and the soil is cracking!” Baba said during a farmers’ meeting.

Ronald, another farmer in the meeting, replied, “If we knew about this, why do we even bother [meeting and making plans]?” He continued, “If there is no water, we might as well do nothing. It’s bound to die sooner rather than later anyway.”

As the irrigation water was consistently running low, the farmers’ suspicions led them again to the Pond. In March 2024 Yana, Baba, and Ronald conducted an investigation. They explained their method:

We heard that the Pond had become a dumping area. We decided that we had to make direct observations, up close, to record this as evidence. So we entered from the nearby oil palm field. It turns out that there were indeed dumping activities happening on the north side of the Pond. To make sure, we asked our friend from the Bengalon Subdistrict office to fly his drones to record the Pond . . . After that, we tried to analyze the remaining [Pond] area by its appearance on the map . . . that is when we got the result that only ten hectares of the Pond remained.

The farmers' field observation indicated that the Pond was inactive. The farmers found out that there was no new record of water treatment. The water level was also low in the outlet, with very little water coming out of the outlet pipe. Moreover, the locks were corroded, proof that they had not been used for a while. Baba added, "We can see the dying tree standing tall in the middle of the lake . . . it means half of the Pond [water] is gone."

Based on interviews and official documents, four factors contributed to the Pond's water scarcity. The first was related to Komar's earlier explanation: to fix the issue of sedimentation in 2023, the mining operation pumped water back to the pit, decreasing the Pond's water volume. Second, no significant amount of water was pumped from the mine pit to the Pond in 2024, due to a change in mining activity; this significantly reduced the Pond's water flow. Third, because the Pond is integral to the extraction landscape, material from the mining pit was dumped into it, reducing its capacity to hold water. Lastly, according to Nicholas, as a *kolam detensi* (detention pond), the Pond's infrastructural characteristic is to discharge water rather than retain it.

On March 13, 2024, the farmers sent a letter to KPC requesting an audience regarding the water scarcity issue. The letter, according to them, was never replied to. The farmers then sent the drone video recording of the condition of the Pond to one of KPC's field officers. This had a profound effect. In the following days, KPC supervisors conducted surveys of the Pond. Later, they told the farmers informally that they would communicate this matter to the mining contractors. According to Ronald, the dumping activities in the Pond have stopped. However, the water volatility has created a sense of insecurity about the future. As Yana explained:

During these months [May and June] they [farmers] don't need large amounts of water because they are harvesting. However, in one to two months they will need a lot of water as it will be the start of [rice planting] season. But until now, the water is still scarce.

The impact of water scarcity on crops is significant. For example, according to the May 2023 and May 2024 harvest data reports, the rice production of 36 farmers dropped by 22 percent (Bina Warga 2023; 2024). In the December 2024 harvest period, farmers faced losses of up to 30 percent due to water scarcity (KPC 2025).⁵⁾ In their understanding, dumping activity reduced the Pond's capacity, and the murky water carried suspended material that caused siltation, hence decreasing the water channels' ability to distribute water. In addition, Indonesia faced a prolonged dry season, from mid-2023 to early 2024 (Simpkins *et al.* 2024). Based on data provided by Indonesia's Meteorology, Climatology, and Geophysics Agency (BMKG 2025), the

average rainfall in Bengalon from August 2020 to July 2025 was 197.32 mm; however, from June 2023 to May 2024 the average rainfall decreased to 174.5 mm. Thus, depending on the Pond is the only way for farmers to sustain their farms. As Ronald said, “The Pond is our only hope for water”; his comment reflects the changing climate and the transformation of the Segadur waterscape.

While farmers depend greatly on the Pond, this dependency also creates uncertainty and insecurity about the future. The farmers want the Pond to function as a dam, regulating and retaining water even after the mining activity is over. However, as an infrastructure of extraction, the Pond functions to discharge rather than retain water and thus keep the mine dry. Moreover, according to Nicholas, after the mine is closed down at some point in the future, all settling ponds will be decommissioned and demolished, including the Pond. The current village head expressed his concern: “If there is no more mining activity up there, what will become of the farmers down here? All of the water for their farms comes from up there [the Pond].”

With violence defined as “any action or inaction that increases vulnerability” (Turner 2022, 192), the increased vulnerability due to the Pond as slow violence does not have to be obvious, as Segadur waterscape transformation takes form in everyday lives in an uneven relation. Differential power relations embedded in infrastructure may appear utilitarian, yet they carry acts of violence (Howe *et al.* 2016). Water infrastructure directly impacts populations not only as a material channel that shapes forms of violence and environmental catastrophes but also as an instrumental factor in recurring forms of harm (Rodgers and O’Neill 2012).

For farmers, living with the uncertain water infrastructure creates a sense of water insecurity. Their livelihoods depend on their ability to access and control water for irrigation, which is situated in an asymmetrical relation to the Pond. The water insecurity in this story showcases how water infrastructure marginalizes local agriculture, putting small farmers in a vulnerable position. While their livelihoods are vulnerable, they become more dependent on the extractive infrastructure to enable water flow from the remaining catchment area of the Pond. The slow violence of the infrastructure becomes visible through “infrastructure inversion.” Infrastructure inversion allows us to understand the inner workings between different stakeholders, different interests, and unequal power relations surrounding the operation of an infrastructure, “to make sense of complex processes of temporal transformation” (Carse and Kneas 2019). The next section shows how water transformation brought about by the Pond also affects farmers’ pest-control practices, eroding their ethical values and risking further environmental violations.

4 Disconnected Water: Excessive Pesticide and the Erosion of the *Sama-sama Cari Makan* Ethic

I first heard the phrase “*sama-sama cari makan*” from Baba during a dinner at his house. Initially, he told me about the various kinds of rituals farmers in Segadur engage in when they begin planting rice. The ritual comprises *syarat* (offering) and *doa* (prayer). The *syarat* consists of various offerings made on the field, such as water, betel nut, betel leaf, egg, and cigarettes presented on a teak leaf, and is followed by a *doa* in the Islamic tradition. *Syarat* followed by *doa* is a way for farmers to ask permission from the land, the water, and its inhabitants before planting.

Baba then continued to talk about the *pantangan* or *pamali* (taboo) against killing animals or pests through the use of pesticides. According to him, some farmers refused to apply pesticides even though agricultural officers kept reminding them to do so, especially in the initial phase of rice planting. Baba explained that for farmers who believe in *pantangan* or *pamali*, “Pests are the same as us; they are also *sama-sama cari makan*.” This ethic is rooted in the belief that animals and pests are also rightful inhabitants of the land, a belief that is expressed through the ritual of *syarat* and *doa*. For example, some farmers in Segadur do not use poison to exterminate snails, saying, “It is *pantangan*,” and some do not chase away birds, explaining, “The birds are just here to collect their part. They will not stay long.”

This ethic is found also in other villages outside Segadur. Budi, a blind rice farmer from Sekerat, about 30 kilometers northeast of Segadur, explained that although pest invasions were increasing, he refused to use excessive pesticides. He said, “They [insects and birds] too are looking for food (*mereka juga sama-sama cari makan*).” Budi explained that *sama-sama cari makan* is closely connected with the Islamic values of *ikhlas* (sincerity) and *amal* (virtuous deeds). Part of his *doa* is to ask for *keikhlasan* (sincerity) every time he begins rice planting: “Because there is no power but God,” he said. Initially, he was not like this. He used to get upset when monkeys ate his crops. He applied a lot of poison to kill them, but the only thing it killed was his crops. Then he received a suggestion from a family member: “You just have to be *ikhlas*. They are only taking what is theirs and leaving what is rightfully yours. Don’t be upset, because what they took will not be wasted. It will be your *amal*.” After that, Budi said, he believed that being *ikhlas* would be his *amal*, because *kebaikan* (kindness) is one of God’s names. “If we have to kill something,” Budi continued, “we have to kill it with kindness, as pests also come from God.”

A female rice farmer in Segadur, Dini, was also reluctant to use pesticides, even for exterminating rats. She explained:

Usually when I am in the field, I imagine myself telling them [rats], “Just take what is yours and leave my part.” I believe that if we kill them in large numbers, they will return in more massive numbers and destroy the crops.

Some farmers, especially those from the older generation like Dini, believe that rats possess mystical powers. One Bengalon elder described rats as a kind of *makhluk gaib* (mystical creature) that comes without any warning, storming rice fields before quickly vanishing into the night. He said, “If the rats get to know that you killed some of them using rat poison, they will storm your rice field, bringing more packs of rats. Hectares of rice fields will be gone in a night.” Similar stories were shared by other farmers in and outside Segadur.

These stories show that the ethic of *sama-sama cari makan* is shaped by the Islamic values of virtuous deeds, sincerity, and kindness. Beliefs about killing other species are shaped also by local mythology, by the conviction that some animals are sentient beings and possess supernatural powers. This ethic materializes in the everyday practice of *pantangan* and *pamali* as well as rituals and manifests in ethical pest control. On the subject of killing and killability, instead of asking “How do we live?” Bhargupati Singh and Naisargi Dave ask, “How do we kill?” They argue that to speak of the quality of life is also to speak of the quality of death, as “the mode and mood of death may be a matter of life itself” (Singh and Dave 2015, 244–245). Ethical conduct, thus, is practiced in the web of relatedness with other species. Human life is related to the life and death of animals around us. As Radhika Govindrajan notes, the ethical “is situated and historically entangled with animals” (Govindrajan 2018, 16). Moreover, moralities and ethics projection are not limited to language and social activity but come from the “ontological conditions for being in the world” (Zigon 2014, 24).

In Segadur, water is an important material for ethical pest control. For example, Dini relies on water management to control the golden snail population. She explained:

I don’t use pesticides. I drain the water to dry my rice field for two to three days. After that, I put the water back into my field. I repeat the process several times during cultivation. That way, the golden snails usually won’t be too much of a problem.

Asked why she did this, while washing her hands at the irrigation canal she answered, “Golden snails are also *sama-sama cari makan* just like us.”

Cecilia Chen *et al.* suggest that “thinking with water” is critical to understanding the framework of ecopolitics. They ask, “Can ethics apply to the more-than-human

world, and can political agency be attributed to the work of water?" (Chen *et al.* 2013, 7). By thinking with water in the Segadur context, I argue that human relatedness with more-than-human entities is interconnected through and within the materiality of water. Mielle Chandler and Astrida Neimanis (2013) argue that water enables the conditions for human ethics by becoming a milieu with its capacity of "gestationality," facilitation of the "not-yet," and its material mode of responsivity. Water makes the ethical possible by dissolving the sovereign self in response to others, both human and more-than-human (Chandler and Neimanis 2013, 62). Water becomes the substance that provides the ontological conditions for being ethically related to others in the world, as "we are ethical because we are first, beneath our social and political commitments, watery" (Chandler and Neimanis 2013, 78). Hence, when water is disconnected through turbidity and scarcity and insecurity increases, the ethics of life and death (killing) are also at stake. The ethical question of killing creatures with pesticides, I argue, should be understood through the lens of water.

In recent years, there have been reports of increasing pest proliferation. In May 2023, Segadur rice farmers reported various kinds of pest attacks that caused a significant decline in production. The pest attacks were so severe, one field officer said, that failed harvests (*puso*) were recorded also in several villages in Bengalon.⁶⁾ During a training session in 2023, an agricultural expert said that the pest infestation in Segadur was due to an increase in pesticide use by farmers in Bengalon. Yet from the farmers' point of view, the efficacy of the pesticide they used was decreasing. For the farmers, this was the only explanation for the tenacious recurrence of pests and weeds they had to endure daily. This encouraged them to use excessive pesticides; as one farmer at the training session said, "We have tried all kinds of brands, mixed them with others, and increased the dosage. But still the pests keep coming back!"

Studies in pest control have shown that poor water quality reduces the efficacy of pesticides (Daramola *et al.* 2022; Mirzaei *et al.* 2023). Farmers who are not aware of poor water conditions cannot overcome the situation, which "will result in unnecessary herbicide use" (Mirzaei *et al.* 2023). Excessive pesticide use in Segadur is closely linked to the inconsistent water quality there. In our December 2024 survey on 47 Segadur farmers, 42 of them said that they had experienced poor water quality and water scarcity, and 28 farmers perceived their water as "scarce, poor, and/or acidic."

This perception was validated by a water quality analysis conducted in 2025 (Sucofindo 2025). Two of the five sampling points in the farm area indicated acidic water with slightly low pH levels (5.76 and 5.98), generally acceptable iron (Fe) levels (1.25 mg/L and 0.20 mg/L), and high concentrations of phosphate (P) (0.67 mg/L and 0.47 mg/L).⁷⁾ While farmers in Segadur experience unpredictable (turbid, scarce) and

inconsistent water flow for irrigating their fields, the use of pesticides in large quantities may also contribute to water quality degradation and is detrimental to the environment (Rajak *et al.* 2023).

Besides quality, water flow is also important for controlling pests, especially weeds and rats. Segadur rice farmers know that land, water, weeds, and rats are interconnected. Rats invade rice farms and breed on patches of land where weeds grow. Hence, after applying enough herbicide, Segadur farmers usually water the rice field for two days so weeds cannot grow. This practice is repeated to control weeds and rats in the rice fields. However, water scarcity directly affects rice farmers' ability to control rats. "If there is no water, weeds grow. Because weeds grow, it attracts rats, and rats eat the rice," explained Baba. Once relying on multispecies interaction and water to control rodents, rice farmers now turn to experimental knowledge using and mixing all kinds of rodenticides to control the rodent population. A few have even experimented with using used car lubricant oil to expel rats from their rice fields. Excessive and experimental pesticide use indicates farmers' anxiety and insecurity about their farms amid environmental changes and water uncertainties.

Before the Pond was constructed in 2020, the Segadur waterscape had already been significantly transformed due to government-built irrigation canals, developed farm plots, and the promotion of intensified farming. After 2020, however, the Pond further altered the Segadur waterscape by reducing the diversity of water sources and flows. It reshaped the landscape and increased farmers' vulnerability by making them dependent solely on the Pond. From 2022 to 2024 the water in Segadur became unpredictable, with cases of turbidity, floods, and scarcity. The Pond, as an infrastructure of extraction, creates a sense of insecurity among farmers and establishes unequal relationships with water. Resource extraction and its infrastructures reorder the material lives of water and inhabitants, creating disconnection and potentially contributing to further destruction, as happens in resource frontiers (Tsing 2005) and in the case of large-scale development projects such as mining and hydroelectricity infrastructure (Kane 2012).

Initially, farmers and pests were interrelated and connected through and within the watery connection. However, the Pond's effect on the Segadur waterscape has been uncertainty, disrupted water flow, and a disjuncture in the ontological condition. Without watery relatedness, more-than-human connection is disrupted. Farmers' practices have shifted from ethical pest control to excessive pesticide use. A form of slow violence is occurring—less obvious, subtle, and unobservable, yet significantly compromising the environment, eroding ethical practices and values, and driving further ecological destruction.

5 Conclusion

This study explores the effects of a coal mining company's water infrastructure on Segadur's waterscape and its farmers, who are interconnected through water. In this context, the Pond is more than a water infrastructure; it is also an instrument of extraction. The Pond's inherent capacious agency has reshaped the waterscape, the land, and the relationship among actors, both human and nonhuman. From its inception, the Pond transformed the Segadur waterscape by reducing its streams, altering its quality and volume, and thus producing contestation between farmers and mining companies over access and the meaning of water.

Water-related contestation takes place in an asymmetrical terrain, as the water infrastructure asserts techno-political power that reconfigures the farmers' relationships with water. It sustains unequal relationships in accessing and claiming water, contributing to a greater vulnerability, sense of insecurity, and dependency on extractive infrastructure and corporate intervention. Ecological alteration and water volatility also have unintended consequences, such as excessive pesticide use. The excessive use of pesticides compromises the multispecies ethic of *sama-sama cari makan*. This slow and steady ecological destruction and ethical disjuncture inflicted by the water infrastructure should be understood as a form of slow violence.

Understanding the material effects of water and infrastructure exposes the slow violence layered into farmers' everyday lives. The first layer is the Pond's impact on farmers' livelihoods through waterscape transformation. The second is farmers' experience of water insecurity caused by turbidity and scarcity, which generates greater vulnerability while intensifying dependency on the Pond. Finally, as water quality and flows are compromised, excessive pest-control practices harm the local farming ecosystem while slowly eroding the ethical knowledge and practice of *sama-sama cari makan*.

More broadly, amid the growing trend of large-scale resource extraction and development projects in Indonesia and Southeast Asia, this article shows how water can serve as a lens to understand the complex relationships between resource extraction, infrastructure, and local communities. Despite the spatial and temporal limitations of this study, focusing on the materiality of water and local experiences with water infrastructure sheds light on human-water relationships, the technopolitics of infrastructure, and the ethical dimensions of water. Understanding these local complexities helps in addressing issues of extractivism, development, and environmental justice while recognizing the agency of nonhuman actors in shaping society and space (Steinberg and Peters 2015).

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Notes

- 1) For example, Law Number 32 of 2009 on Environment Protection and Management, and Law Number 17 of 2019 on Water Resources regulate felony charges.
- 2) At the end of 2022, KPC operated 54 compliance points: 36 mining wastewater compliance points, 7 marine wastewater compliance points, and 11 domestic wastewater compliance points. In 2022 the total water discharge was 706,306,440.39 m³ with a catchment area of 25,014.71 hectares. That year KPC used 20,937.56 tons of lime and 16,141.06 tons of alum (KPC 2023).
- 3) According to Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number 5 of 2022, the *baku mutu* for pH level for coal mining wastewater is 6–9.
- 4) The technopolitics of water has a spatial-temporal dimension. Place-based and time-specific subjective experiences with water are often denied by the objective abstraction and legal-formal framework. According to Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number 5 of 2022, the *baku mutu* for maximum total suspended solids (TSS) for coal mining wastewater is 400 mg/L. The Sucofindo water analysis, almost a year and a half from the Fopsir report, shows that all five sampling sites in Segadur had TSS levels below the regulatory *baku mutu* (Sucofindo 2025).
- 5) East Kalimantan's rice production in 2023 dropped by 5.2 percent, and productive land decreased by 12.14 percent compared to 2022, with Kutai Timur Regency experiencing an absolute decrease (Arumanto 2024). The water supply issue is closely related to the decline in productive farms and the decrease in rice production in East Kalimantan (Andreas 2024).
- 6) The pest outbreak in Kutai Timur Regency, which decreased food production in 2023, became a political issue. In November 2023 a Kutai Timur legislative member demanded that the regency government provide financial support to local farmers who had suffered harvest failures due to pest outbreaks (Editorial Kaltim 2023).
- 7) According to Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023, the *baku mutu* for iron (Fe) and phosphate (P) is a maximum of 0.2 mg/L.

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