

Community Perception of Gold Mining Affecting the Water Quality of the Wariori River

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Abstract

This study examines community perceptions of gold mining and its impact on the water quality of the Wariori River in Aurmios Village. The population involved all residents of Aurmios Village with a sample size of 20 (twenty) people. Using a qualitative research approach based on postpositivism and interpretive philosophy, data were collected through triangulation, combining observation, questionnaires, and interviews. The results show significant negative impacts of illegal gold mining on water quality and community life. The majority of respondents (95%) reported an increase in river water turbidity after mining activities, in line with the findings of Yulianti et al. (2016) and Putri Ade Rahma Yulis (2018) on the increase in Total Suspended Solids (TSS) and heavy metal pollution. In addition, 100% of respondents reported reduced clean water sources, leading to economic and health challenges, such as increased healthcare costs and a shift in livelihoods from fisheries and agriculture to gold mining. Environmental impacts include ecosystem degradation and increased flood risk, and 100% of respondents recognized these issues. In order to address these adverse impacts, the study recommends strict government measures to regulate illegal mining, establish safe and legal mining operations, provide clean water infrastructure, as well as educate communities on the dangers of illegal gold mining. These measures are essential to restore the water quality of the Wariori River and ensure the sustainable well-being of Aurmios villagers. Further research is needed to monitor long-term impacts and develop effective mitigation strategies.

Keywords: Gold Mining Affecting, Water Quality, Wariori River.

1. Introduction

Wariori River is the largest and longest river in Manokwari, West Papua. The headwaters of this river are in Masni District, precisely in the Aurmios mountainous area, and empties directly into the sea. The width of the Wariori river averages between 500 to 600 metres with an average depth of 8 metres. In the funnel-shaped estuary, the width reaches 1.000 metres, making the Wariori River the widest river in West Papua. The longest part of the river starts upstream in the Masni region at Mubri Wariori, while the rest flows to the estuary in the Manokwari region (Sofyan, 2019). The discovery of gold in the Wariori River in 2008 changed the economic and social dynamics of the surrounding community. Initially, locals accidentally found gold nuggets in the river, which then triggered great enthusiasm for gold panning. In 2011, mining activities intensified with the arrival of miners from outside Manokwari. Miners often use a profit-sharing method with investors who provide water suction machines and chemicals for gold refining. However, this activity is not free from risk, as happened in 2019 when a miner named Ardy was swept away and found lifeless (Admin, 2019).

Economically, traditional gold mining has a positive impact on the surrounding community. According to a study (Siregar et al., 2023), illegal gold mining can provide significant income (Azumah et al., 2021; Matshusa & Leonard, 2022), reaching IDR 600,000-IDR 800,000 per week. Some miners have even obtained 2kg of gold that was sold for up to IDR 1.8 billion (Chakuya et al., 2023). In addition, people without mining skills often become couriers who deliver fuel and food to mining sites located in the middle of the forest (Siqueira-Gay & Sánchez, 2021; Siregar et al., 2023; Tukur et al., 2022; Yiridomoh, 2021). However, despite the economic benefits, there are negative health and environmental impacts (Tukur et al., 2022; Yiridomoh, 2021). Many people feel sick after swimming in the Wariori River, with symptoms, such as high fever. Gold mining also involves the use of mercury in the gold separation process, which adversely affects water quality and the health of residents (Hasibuan et al., 2022; Meutia et al., 2022;

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Waack et al., 2023). Febriyana noted that the use of mercury has reduced the number of fish caught in the river, which used to be the main source of protein for the local population (Esdaile & Chalker, 2018; Rahim, 2014).

The gold mining licensing process is regulated by Government Regulation No. 25 Year 2023, which requires business owners to obtain an Exploration Mining Business Permit (IUP) and Production Operation IUP. In addition, they must carry out a series of general investigation, exploration, and feasibility evaluation processes before starting mining activities (Edegbene et al., 2023; Tukur et al., 2022). This licensing process is conducted through the Online Single Submission Risk Based Approach (OSS-RBA) system, which facilitates the submission of licences online (Budi, 2023).

This research aims to assess the impact of illegal gold mining (PETI) in Aurmios Village on the water quality of the Wariori River in Masni District, Manokwari Regency. The Wariori River, which was previously an abundant natural resource with fish and clean water for daily needs, is now experiencing ecosystem damage due to mining gold activities. The river water has become murky and smells bad, so it can no longer be used for washing clothes and bathing as before.

2. Research Method

Qualitative research method is an approach rooted in the philosophy of postpositivism or interpretative, which is used to study the natural conditions of the research object with the researcher as the main instrument (Siregar. & Syofian., 2017; Sugiyono 2020, 2020). The population of this study were all residents of Aurmios village and the sample was 20 people from Aurmios village. Data collection was done through triangulation, which combined observation, interviews, and documentation. The data collected were generally qualitative, and the analysis was done inductively or qualitatively. The purpose of qualitative research is to understand meaning, explore uniqueness, construct phenomena, and formulate hypotheses (Winarni, 2018). This research used two data collection methods, namely questionnaires and interviews. Questionnaire is a data collection method in which respondents were asked to answer a series of written questions or statements (PD Sugiyono, 2020). This technique is effective when the researcher has determined the variables to be measured and has clear objectives from the respondent. Questionnaires are suitable for research with many respondents spread across various regions. The form of the questionnaire can be closed or open questions, and can be submitted directly, via postal mail, or online media. The questionnaire used had 20 (twenty) questions. An interview is a meeting between two people to exchange information and ideas through questions and answers, so that meaning can be obtained from a particular topic (PD Sugiyono, 2020). This interview has five questions to collect data (Martono, 2016; Nurahma & Hendriani, 2021).

3. Results and Discussions

3.1. Questionnaire Results

The questionnaire results show that the majority of respondents (95%) agreed or strongly agree that the water quality in Aurmios Village became murkier after gold mining. This suggests that gold mining activities have a direct impact on river water clarity. Study by Yulianti et al. (2016) Sungai Limun also found that illegal gold mining increased TSS (Total Suspended Solids) and heavy metal content, leading to a decline in water quality. In the Wariori River, TSS reached 1541 mg/L downstream, far exceeding the permitted limit of 50 mg/L. While 85% of respondents were neutral about the increase in heavy metal content in water after gold mining, 10% of respondents agreed or strongly agreed. This shows that there is uncertainty among the community regarding heavy metal content in water. Research by Yulis et al. (2018) in the Kuantan River found that although the pH value was still within normal limits, the mercury content was high, supporting the findings in the Wariori River regarding an increase in heavy metals due to gold mining.

Gold mining activities have also reportedly led to a reduction in clean water sources for daily needs, with 100% of respondents agreeing or strongly agreeing with this statement. This condition forces communities to seek alternative water sources that are often insufficient, especially when wells are dry. This problem is exacerbated by the fact that 80% of respondents found it difficult to access other clean water sources after gold mining activities. Study Ningsih (2018) research on the Batanghari river show that mercury contamination in irrigation water has a negative impact on public health and agricultural soil fertility, consistent with the findings in Aurmios Village.

3.2. Economic and Health Impacts

The decline in water quality also had a significant impact on the community's economy. A total of 100% of respondents agreed that the community's income fell along with the decline in water quality after gold mining. Interview results showed that many fishermen and farmers were forced to switch professions to become gold miners because fish and agricultural catches dropped dramatically. The decline in agricultural yields due to the use of contaminated water is also supported by Ningsih (2018), which found that high mercury concentrations affect agricultural land (Ningsih, 2018).

Community health is also affected, with 100% of respondents stating that health care costs have increased following gold mining activities. Interviewees mentioned health symptoms such as itching after using river water, which may be caused by heavy metal content or other hazardous chemicals used in the gold mining process. Exposure to heavy metals such as mercury can cause kidney damage, nervous system disorders, and developmental disorders in children, as reported in a study by (Yulis et al., 2018).

3.3. Environmental Impact

Gold mining activities also impact the environment, with 100% of respondents agreeing that gold mining causes damage to aquatic ecosystems. Interviewees stated that poor water quality has reduced fish populations in the river, disrupting the river ecosystem that is a source of livelihood for local communities. Research by Yulianti et al. (2016) found that increased TSS due to gold mining caused sedimentation which reduced water quality, in line with findings in the Wariori River. As many as 100% of respondents also agreed that gold mining increases the risk of flooding in the village Aurmios. The interviewee stated that floods often occur after mining activities, which are most likely caused by land damage and disrupted water flows due to mining. This flood caused the river water to become cloudy, making it difficult for people to get clean water for their daily needs.

3.4. Government Recommendation and Action

To address these negative impacts, decisive action is needed from the local government. A total of 100% of respondents agreed that the government should take action to address the negative impacts of gold mining on water quality, and 80% of respondents felt there was a need to educate the community on the impacts of gold mining to raise awareness of the water quality of the Wariori River. Interviewees suggested that the government should curb illegal mining and build safe, legal mines so that communities can mine safely and earn a decent income without damaging the environment. In addition, providing access to clean water through the installation of water filters or the construction of clean water infrastructure is needed. Interviewees expected that the government could provide solutions to overcome this problem, as also proposed by Ningsih (2018) to overcome water contamination due to mining.

Based on the results of this and previous studies, it is clear that illegal gold mining activities in Aurmios Village have significant negative impacts on the water quality of the Wariori River and the daily lives of the community. These impacts include increased TSS and heavy metal content in the water, decreased water quality leading to reduced clean water sources, disruption to community livelihoods, increased health care costs, and damage to aquatic ecosystems.

These findings are consistent with research Ningsih (2018); Yulis et al. (2018), which all show that illegal gold mining has a negative impact on water quality and public health. Therefore, decisive action is needed from the local government to address this issue, including the curbing of illegal mining, the construction of safe legal mines, and community education on the dangers of illegal gold mining. In addition, providing access to clean water is crucial to ensure the well-being of the people of Aurmios Village.

With these measures, it is expected that the water quality of the Wariori River and the lives of the community can return to normal and sustainable. Further research is also needed to monitor the long-term impacts of gold mining activities and to develop more effective mitigation strategies.

4. Conclusion

This research examines community perceptions of gold mining affecting the water quality of the Wariori River in Aurmios Village. Results from questionnaires and interviews show that illegal gold mining activities have had a significant negative impact on river water quality and the lives of local communities. The majority of respondents (95%) stated that the water quality became murkier after gold mining. The increase in TSS (Total Suspended Solids) and heavy metal content in the water after gold mining indicates serious pollution, as also found in the study of Yulianti et al. (2016). A total of 100% of respondents agreed that gold mining activities caused a reduction in clean water sources for daily needs, and 80% of respondents found it difficult to access other clean water sources after gold mining activities. This impact is exacerbated by increased health care costs due to health symptoms experienced by the community, such as itching that may be caused by heavy metal content in the water. Gold mining has also had an impact on the community's economy, with 100% of respondents stating that their income has fallen as water quality has declined. Many fishermen and farmers have been forced to switch professions to become gold miners as fishing and agricultural yields have decreased dramatically. In addition, 100% of respondents agreed that gold mining increases the risk of flooding in Aurmios Village, caused by land degradation and disrupted water flow due to mining.

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