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IMPLEMENTATION OF ACTIVE CHARCOAL FILTERING AND PHYTOREMEDIATION TOOLS AS AN EFFORT TO CONTROL MERCURY WASTE IN PADESA VILLAGE, LANTUNG DISTRICT

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Abstract

Background: Land clearing disputes between communities and foreign investors for gold mining. Where in the end the community chose to open small-scale gold mining lands that only utilized spindles and mercury as amalgam with insufficient knowledge in the use of mercury and the processing of the resulting waste. Situation analysis: Residual mercury from the waste of each log averaged 0.03782 mg/L. The management of waste from logs containing mercury is not anti-absorbent and is left to dry on its own. Lack of concern for waste management is caused by a lack of knowledge about the dangers of mercury. The river water flow in Mitra Village comes from Tetanggga Village which has the same activities. Problems: The waste is allowed to dry on its own causing soil pollution, mercury levels in the river are 0.002 mg/L which exceeds the standard, and there is a lack of public knowledge about the dangers of mercury. Solution: Provide education through counseling on the impact of mercury, training on the manufacture and application of filtering tools and phytoremediation methods. Construction of permanent settling tanks and shelters so that they become anti-absorptive. Conclusion: As many as 94.4% had very good knowledge and 5.56% had good knowledge after conducting counseling on the impact of mercury and 2 logs which were being built with permanent anti-absorptive settling tanks and holding tanks.
Keywords: Activated Charcoal, Coconut Shells, Mercury, Phytoremediation, Waste.

INTRODUCTION

Industrial progress has a positive impact on improving the quality of human life. But on the other hand, industrial progress actually has a negative impact on the environment. Industrial progress, including land clearing for traditional mining which is not supported by good technology and knowledge will cause environmental pollution by mining waste (Delgado, et al., 2012). This happened in Padesa Village where there was a land clearing dispute between the local community and foreign investors for gold mining. Where in the end the community chose to open small-scale gold mining lands that only used spindles and liquid mercury as amalgam.

This small-scale gold mining business is the main source of increasing the people's economy in Padesa Village. However, this activity is not supported by public knowledge

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about mercury and its impact on health and the environment. This can be seen from the use of mercury without PPE, the management of waste logs which are left to dry on their own in holding tanks in the form of earth excavations. RI Government Regulation No 101 of 2014 concerning Hazardous and Toxic Waste Management, article 31 paragraph 1 states that everyone who produces B3 waste is required to collect the B3 waste produced. However, in reality, the gold processing business by amalgamation has disposed of the waste from its processing to the surrounding environment. The average residual mercury in waste is 0.03782 mg/L, where this data exceeds the standard of Minister of Health Number 32 of 2017, namely class 1 (1×10-3 mg/L), class 2 and class 3 (2× 10-3 mg/L), and class 4 (1×10-3 mg/L). If left alone, it will cause environmental pollution.

During the deposition time interval, absorption processes can occur into the soil pores, resulting in groundwater contamination. The level of soil contamination depends on the speed of seepage and flow of water in the soil which is influenced by the volume of waste discharged, the depth of the reservoir and evaporation of ground surface water (Dalimunteh, et al., 2019).

The use of mercury as amalgam in small-scale gold mining activities can not only produce environmental pollution but also cause health problems. According to Sulniawati (2017) states that methyl mercury will accumulate in the body of biota and if consumed by humans in the long term it will cause various diseases and death.

Therefore, this service activity aims to improve settling tanks and storage facilities to make them permanent and anti-absorptive, improve waste disposal management by using coconut shell activated charcoal filtering tools, reduce levels of residual mercury in waters by applying the phytoremediation method and increase public knowledge and awareness about mercury through counseling on the dangers of mercury.

IMPLEMENTATION METHOD

The methods used in this community service activity are (1) providing education through outreach activities, (2) Training and application of active charcoal filtering tools and phytoremediation methods, (3) construction of anti-absorbent storage tanks, and (4) analysis of mercury levels with mercury analyzer.

RESULTS AND DISCUSSION

1. Knowledge Aspect

Increased knowledge is carried out through outreach activities on the impact of mercury and counseling on mercury pollution control as follows:

Figure 1. Education on the Impact of Mercury

Figure 2. Extension of Waste Control with Phytoremediation and Activated Charcoal

Increased public knowledge about the dangers of mercury increased 100% after education through counseling on the effects of mercury. This can be seen in the following graph:

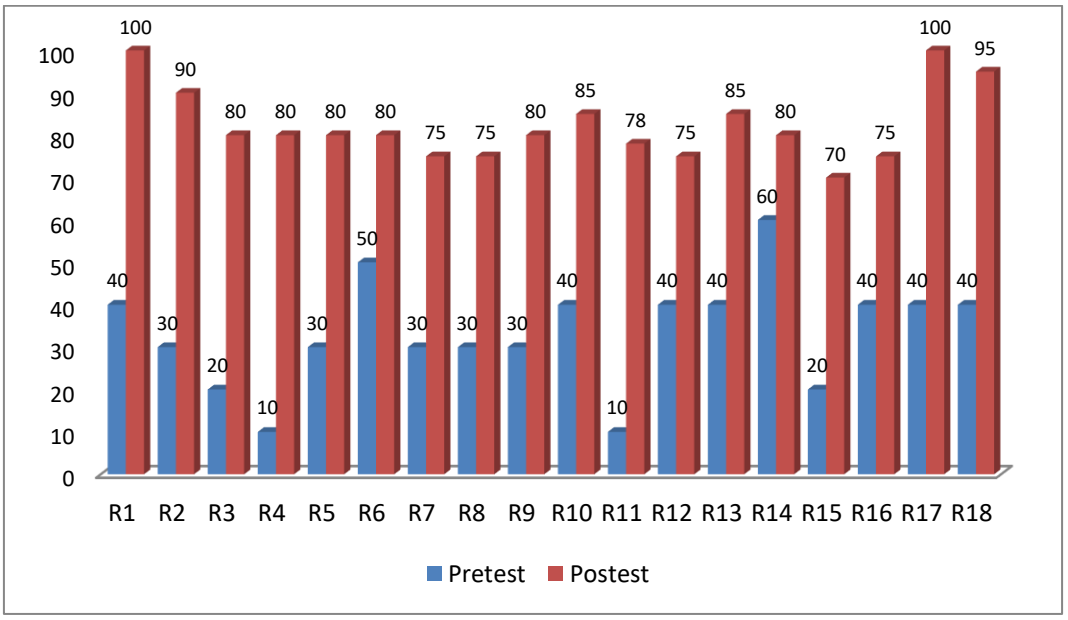

Figure 3. The results of measuring the increase in community knowledge

Based on the graph above, it can be concluded that the knowledge of ASGM workers increases 100% after the extension activities. As many as 94.4% had very good knowledge and 5.56% had good knowledge after counseling activities were carried out.

2. Infrastructure Aspect

For the infrastructure aspect, the construction of anti- seepage storage tanks and settling tanks was chosen by choosing 2 log locations near the river. This activity has only been implemented by 10%. This is related to the long supply of construction materials because the distance between ordering construction materials is very long and the price is far above the normal price. Apart from that, the start of the rainy season has also resulted in delays in the construction of storage tanks where workers have to stop during the rains and have to suck up standing water from the rain first because they have to build a permanent base. In addition, it is necessary to empty the settling basin from the remaining sludge from previous ASGM activities which also requires a long time.

Figure 4. (above) Checking the location of construction infrastructure, and (below) Purchase of materials and lining for settling tanks prior to construction

3. Aspects of Waste Management

This aspect consists of several activities, namely making a pipeline between the settling tank and the second holding tank which has not been carried out because it is still in the process of making a settling tank first as shown in Figure 3 above, then making a filtering device to be applied to sample spindles which can be seen in Figure 3. following picture:

Figure 5. Purchase of activated charcoal screening equipment

CONCLUSION

Based on the analysis of the implementation of community service activities, it can be concluded that:

1. There is an increase in public knowledge about the dangers of mercury
2. Construction of settling tanks and permanent non-absorbable storage tanks has been completed

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