THE ENVIRONMENTAL IMPACT CAUSED BY THE SMALL-SCALE GEM MINING INDUSTRY; WITH SPECIAL REFERENCE TO RATNAPURA DISTRICT IN SRI LANKA.

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Abstract

The gem industry can be identified as one of the world's leading mining industries. This industry has different processes such as mining, gem cutting, and selling. It is also a significant industry in Sri Lanka and has had positive and negative consequences. The main objective of this study is to identify the environmental damage caused by the weaknesses and challenges of using sustainable strategies in the gem mining industry. The Kuruwita DSD was selected as the study area and three GNDs were selected as sample sites. Microsoft Excel was used to analyze quantitative and qualitative data and GIS and Google Earth Pro were used for creating maps and data visualization. Data analysis has shown that the weaknesses and challenges in using sustainable strategies in this industry are detrimental to the environment. The results reveal that 53% of gem mining sites were abundant mine pits and there prevails a lack of awareness about the rules and regulations regarding the gem mining industry. It has also been recognized that using a sustainable approach is imperative due to its environmental impact.

Keywords: *Environmental damage, Small-scale gem industry, Sustainable strategies, Weaknesses & challenges*

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Introduction

The gem industry in Sri Lanka takes place in two forms, large scale and small scale. Both of these types have an impact on the environment. Although proper instructions have been given to the gem industry, the industrialists have not followed that advice properly, which has caused various problems in the gem mining areas. The environment is not rebuilt in a short period. Even the gem resource takes thousands of years to develop. However, digging into the ground and getting those gems takes a little time. Nevertheless, the environmental damage they cause will continue to affect us for hundreds of years. This is a tragedy on one hand.

The Sri Lankan gem business has taken on a whole new dimension with the intervention of new gem trading communities such as China and Russia, and the mining industry is increasingly surpassing environmental regulations and challenging the ecological balance. Due to this, there is an urgent need to focus on the feasibility of using sustainable structures for gem mining in Sri Lanka. " (Soba magazine, 2015). No matter what kind of license is issued, the damage to the environment is not insignificant. Due to this, the people of Ratnapura are facing many problems at present. It is important to identify these harmful conditions associated with gem mining and find appropriate solutions. "Mining in several paddy fields in the lower Karavita section of the Ratnapura District, Balangoda, Imbulpe, and Pelmadulla suburbs has caused many social and health problems in those areas." (Island, 2015).

The National Gem and Jewelry Authority Act No. 50 of 1993 has been enacted to regulate the gem industry. The Special Audit Report of the National Gem and Jewelry Authority dated 14th January 2020 on the activities of the National Gem and Jewelry Authority shows that the laws against illegal gem mining have not been adequately enforced. The same fact has been emphasized in the 2013 audit report. Mechanical mining surveillance is unsatisfactory and on-site inspections are unsatisfactory. The audit report also states that the systems were not installed in any of the mines.

According to those details, the research problem was, what is the environmental impact caused by the weaknesses in using sustainable strategies associated with the small-scale gem industry?

Material and Methods

According to the study, a practical application was made to identify the environmental damage caused by small-scale gem mining in the Ratnapura district. This study can be considered inductive research since conclusions are

made based on observation and surveys. This study is applied research done following an inductive reasoning. In a study like this, data must be collected to fulfil the study's aims. Research methodology can be divided into five main categories as follows; selecting a study area, selecting a sample, data collection, data Analyzing and data presentation.

Sixty samples were selected for acquiring primary data and several sources were used for secondary data. Primary data was collected by using questionnaire surveys, observations, and interviews. Secondary data was collected through a few institutes, such as National Gem & Jewellery Authority, District Secretariat Office, Ratnapura, DSD Kuruwita, Geological Survey and Mines Bureau, Grama Niladhari Division, (Kuruwita/ Kadangoda/ Delgamuwa). Although research articles, books, magazines, newspapers, and the internet were used to collect secondary data the data collected must be systematically prepared for analysis. A combination of data analysis methods had to be used to achieve the research objectives. The findings were analyzed using both qualitative method and quantitative methods.

On the other hand, qualitative approaches were easier to gain a better understanding of the research findings. Quantitative data were analyzed using the statistical data analysis method and basic statistical techniques under MS Excel, and required charts, graphs, and tables were obtained. For better understanding, the researcher used ArcMap 10.7 software to represent the maps. Finally, the researcher used the descriptive data analysis method to analyze the qualitative data.

Results and Discussion

The researcher mainly analyzes the data on the environmental damage caused by weaknesses in the use of sustainable strategies in the small-scale gem mining industry. Accordingly, based on the research objectives, the data collected is used to suggest appropriate action plans to minimize the problems caused by the non-use of sustainable strategies. Here are the data based on 60 questionnaires, mainly from the study area. Here, researcher could identify the weaknesses and challenges in using sustainable strategies in the study area.

- Low educational level
- Lack of awareness of environmental issues in the community.
- Lack of continuous environmental impact assessments.
- Political barriers.
- Lack of government coordination and enforcement.

Here the researcher could identify and present mitigation methods required to minimize environmental damage.

- Mandating the use of sustainable strategies after mining.
- Further strengthening the monitoring system.
- Appointment of evaluation committees to supervise mining-related areas.
- Use of mine for other valuable purposes.
- Formalize mining activities and regulate ecosystem management pragmatically.

The damage to the environment caused by these deficiencies has been studied here in several areas. Environmental impact has been studied in terms of sediment and water pollution, soil erosion, destruction of arecanut trees, effects on biodiversity, landscape effect, and geomorphological changes. These conditions in the region have created a strong need to adopt sustainable strategies. Sedimental and water pollution were one of the areas that could be identified in the study area. This mining adds chemicals to the water. The chemical is used in a variety of situations, so it can degrade the water and damage the quality of water. The same chemical is harmful to fish species.

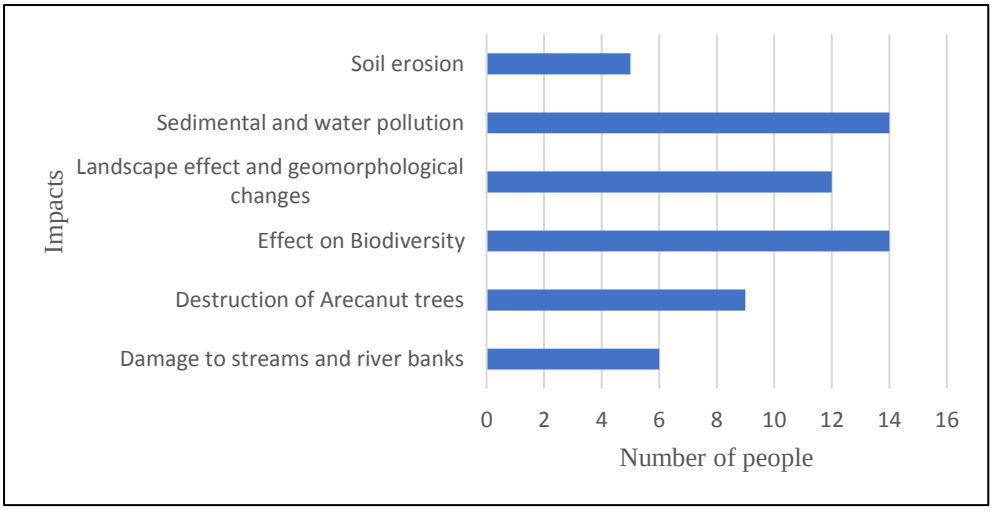
Also, this mining is an excavation process. Therefore, the layers of soil that have been created over some times are subject to mixing due to this mining industry. Below pictures shows the loose soil is then washed with water.

Source: Captured by the author, during the field observations, 2022

It is also a detrimental effect on cultivation. As a result, the study confirmed that paddy cultivation as well as other cultivations have been disrupted. It also confirms the need to adopt sustainable strategies for mining. Sustainable methods can be used effectively for soils and crops that are damaged by mining (Figure 01).

Figure 01:

The environmental impact on gem mining industry



Source: Field survey, 2022

Destruction of arecanut trees is another requirement. Arecanuts are widely grown in the area and are now widely used in the mining industry. Therefore, it is confirmed that this has had an impact on the areca tree population in the area. This is done to prevent the walls of the mines from collapsing and to strengthen the walls to avoid endangering the lives of the miners. But this has had a huge impact on the plant population as a large number of arecanut trees are required for one mine. Thus, instead of using arecanut trees, another method should be followed. This effect on arecanut trees is a weakness in the use of sustainable strategies. Studies also show that the widespread use of these arecanuts should be minimized. That is, to be sustainable. The above is another factor that is needed to use sustainable strategies.

Another thing that became clear in the study was the effects on biodiversity. Mining uses any swamp or paddy field or other cultivated land that is believed to contain gems. Here, the forest areas are cleared and used for mining. The field study revealed that endemic species such as wild roosters were endangered during this process. People claim that even some rare herbs are not found today. It is a really sad situation. Therefore, the study confirms that this industry should be prevented from further damaging biodiversity. It is clear that a formal program needs to be put in place for that. The study confirms that there is an urgent need for the mining industry to adopt sustainable strategies to protect valuable biodiversity.

In terms of landscape effect and geomorphological changes, it can also be seen that the damage has been magnified due to the weaknesses in the use of sustainable strategies. About 85% of the gem mining sites selected for the study were found to be illegally mined. Its impact can go back even to the next century. This geomorphological landscape was not created overnight. It also took years to create. So it is clear from the study that they do not think about it but only think about their advantage. Accordingly, it is implied that there is an urgent need for the use of sustainable strategies.

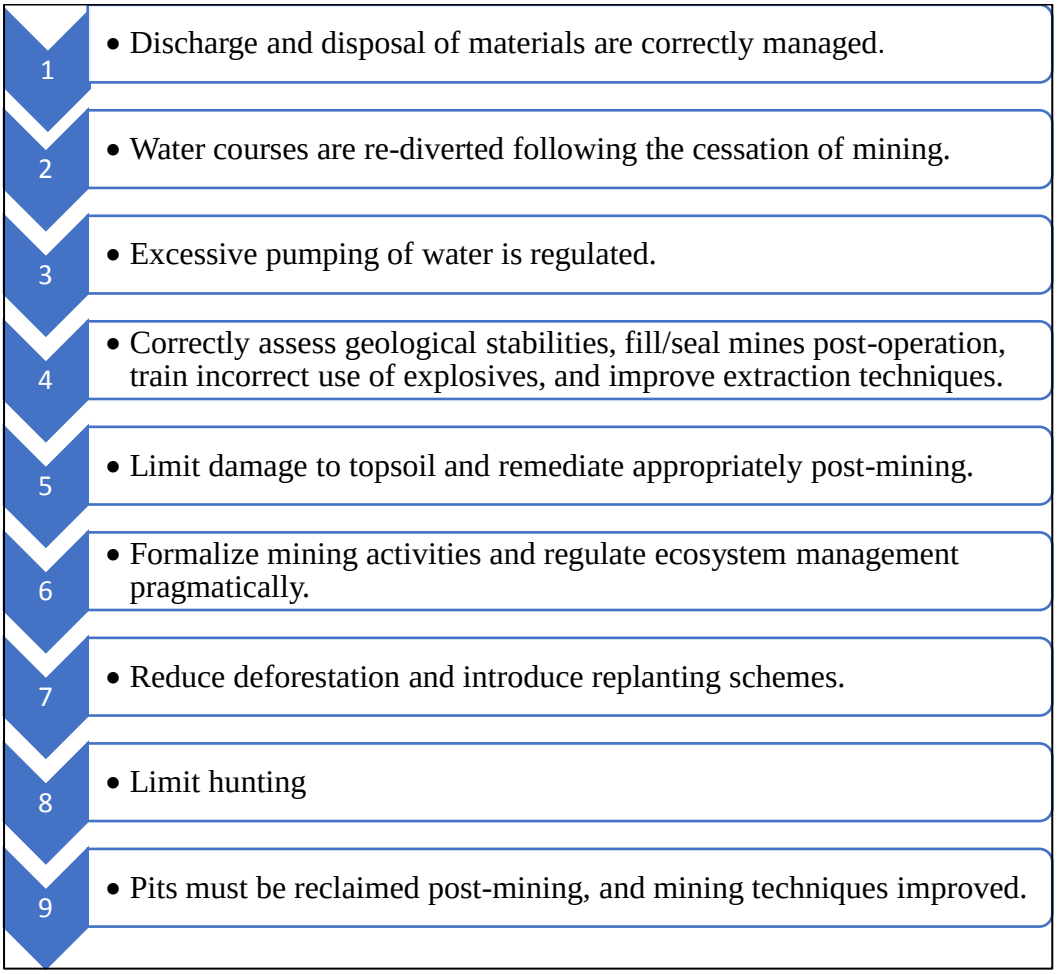
Conclusion and Recommendation

Here, it focuses on identifying the weaknesses and challenges in using sustainable strategies in the small-scale gem mining industry, responding to them successfully, and taking necessary steps to keep the small-scale gem mining industry sustainable in the Ratnapura district. After the analysis, environmental damage assessment? due to weakness in using sustainable strategies in the Gem mining industry.

After considering all the details, the researcher can identify the long-term consequences of the damage in opinion as follows.

Figure - 02

Recommendation for Minimizing the weaknesses and challenges



Source: by Author, 2022

According to the study, it is clear that the weaknesses in using sustainable strategies are causing excessive harm to the environment. Therefore, it is important to address this environmental issue with the relevant agencies and collaborate general community. Moreover, figure 02 shows the recommendation for minimizing the weakness and changes in the gem industry in Sri Lanka.

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