

Impacts on the Natural Environment by Peat Mining Area in Kien Giang, Vietnam

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ABSTRACT

Thoi Trang Canal area in Kien Binh commune, Kien Luong district, Kien Giang province, Vietnam has many peat mining enterprises operating because the quality of peat meets the requirements for organic fertilizer. This study aims to identify the impacts on the natural environment of the area due to peat mining activities. The long-term mining process may cause some negative impacts on the environment, if there are no measures to prevent, control and treat environmental pollution. The next possible impacts are effects on the area's landscape and natural resources, air pollution from mining and transportation activities, possibility of surface water pollution due to mining activities and daily life of workers on the construction site.

KEYWORDS: Peat mining, Environmental pollution, Environmental impact

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I. INTRODUCTION

The peat mine covers an area of hundreds of hectares in the Thoi Trang area, Kien Binh commune, Kien Luong district, Kien Giang province, located in the middle of the Long Xuyen Quadrangle. The area has a flat topographic surface, the average elevation is only about +0.5 m to +1 m above sea level, in some places there are areas of depression up to +0.2 m or deeper. This is an area of fallow, fertile, wild forest with naturally growing melaleuca. Currently, many businesses invest in exploiting peat to make organic fertilizer to serve the increasing agricultural demand. The exploitation of peat with the characteristics of low-lying areas causes many impacts on the natural environment.

Peat mining investment is a non-renewable resource use. The potential impacts on the environment and resources from mining activities include two main impacts: positive impacts and negative impacts. The article aims to identify negative impacts on the environment to take effective preventive measures.

II. RESEARCH RESULTS

2.1. Environmental impacts due to peat mining activities

Peat mining activities inevitably cause adverse effects (emissions, dust, noise, etc.), which degrade environmental quality. These impacts in many cases cause disturbance to environmental factors, change the landscape, including the human living environment, which manifests itself at different levels. Assessing the impact of peat mining on human health often has certain difficulties and is difficult to provide accurate data because there are other influencing factors such as smoking, pre-existing diseases... Some of the main impacts are listed in Table 1.

Table 1: List of negative impacts of peat mining on the environment

Affected object	Sphere of influence
Impacts on geological environment	Impact on regional groundwater quality Changing the topography and landscape of the mine area
Impacts on the soil environment	Changes in topography and land use goals Ground contamination by waste materials
Impacts on water environment	Contamination of surface water by mining wastewater Destruction of local aquifers due to mining
Impacts on air and noise environment	Degradation of air quality and visibility due to dust, emissions Degradation of air quality due to emissions of diesel-powered machinery Noise Concussion
Impacts on biological environment and landscape	Impact on regional landscape Impact on the ecological environment of the area

2.1.1. Impact of different types of waste

Mining activities will produce a large amount of emissions, solid and liquid waste, including vegetation from surface layer removal, soil, daily life solid waste of workers, daily life and mining wastewater.

Exhaust gas: The source of dust and emissions mainly comes from mining and transporting peat. Due to the high moisture content of peat, it will reduce dust generation during mining and transportation.

Wastewater: Wastewater is mainly caused by daily life wastewater of workers working at the mine.

Solid waste:

Impacts due to waste during surface removal:

The vegetation removed if no control measures are taken, when heavy rains will wash it down the canals, hindering the drainage process. If washed into rivers in the area, it will interfere with the metabolism of nutrients, prevent light from entering the water, reduce the process of photosynthesis and reduce the amount of dissolved oxygen, affecting aquatic species. At the same time, they also increase the turbidity of surface water and increase the possibility of material sedimentation.

Impacts caused by daily life solid waste of workers at the mine:

Types of domestic solid waste caused by workers' and other activities... if there is no reasonable collection, classification and concentration measures, it will also cause adverse effects on the surrounding environment. Although this amount of waste is small, it is a biodegradable substance that causes a stench, if not collected and treated, it will pollute the soil environment by losing its senses, creating an environment for pathogenic microorganisms to grow, affecting the air and water environment..

Other wastes: Mainly the impacts are caused by waste oil and grease from the machinery working at the mine. Waste grease is classified as hazardous waste. Oil and grease discharged from the maintenance and repair of machinery and equipment working at the mine is inevitable. The amount of waste grease generated depends on the following factors:

- Number of means of transport and motorized construction on the site;
- Oil change cycle and machine maintenance;
- Amount of oil discharged in one oil change/maintenance.

2.1.2. Impact of mining on biological resources

The vegetation in this area is mainly weeds, the fauna is very few and the fauna in the area is also of almost no economic value. During the mining process, it will have to remove this layer of vegetation on the surface, the vegetation will be lost. In general, the impact on the ecosystem is inevitable. However, the ecosystem in the area is quite poor, so the damage to the ecosystem is generally very little.

2.1.3. Impact on geological and soil environment

The mine area has an average mining depth of about 1.97 m, so there is no feasible plan for leveling the mining pit to return the mine site as before, thereby transforming the terrain into low-lying lakes. This is the cause of some changes in the landscape of the area.

The shallow extraction layer does not affect the groundwater, so the impact on the geology of the area is minimal.

2.2. Measures to minimize negative impacts caused by peat mining activities

2.2.1. Minimizing the impact on the air environment

Impacts on the air environment during mining operations at the mine are mainly dust and emissions from machinery, equipment and means of peat mining and transportation. Therefore, in order to minimize dust generated from using bulldozers to remove surface vegetation (only occurs in the dry season - dry weather conditions), the following measures should be applied:

Equipment, machinery and vehicles mainly use internal combustion engines. If fuel oil is used, the main pollutants are sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon oxides (CO) and dust accounts for only a small part. Light oil produces less dust than heavy oil. The ash content in the oil strongly influences the dust load index. Therefore, choosing the right fuel is the most effective way to reduce pollution sources.

Use the correct fuel for the engine's design.

2.2.2. Wastewater treatment

The main direction in controlling pollution caused by domestic wastewater is to treat wastewater sources before being discharged into the environment. Based on the characteristics of domestic wastewater generated at the mine with a small flow, the most used (and effective) method today for wastewater treatment of households, agencies, and residential clusters is the following: septic tank. The role of the septic tank is to settle solids, anaerobically decompose organic matter and contain residues. Septic tanks are capable of withstanding variable and large loads that do not require special maintenance. Treatment efficiency reduces over 60 -70% BOD5

compared to input. This method is very suitable for mine site conditions. Wastewater after being treated through a standard septic tank will be discharged into the water reservoir.

The principles of pollution control due to daily life wastewater are as follows:

Use water supply for the right purposes and economically to avoid wasting water resources and limit the generation of wastewater.

All wastewater will be treated to the prescribed standards before being discharged into the receiving water source.

Wastewater treatment system must be built at an appropriate location to limit the impact on the surrounding area and avoid causing loss of the general landscape.

2.2.3. Minimizing the impact of solid waste

For each waste source, specific measures are proposed as follows:

Minimizing the impact of surface vegetation removal

Waste in mining operations is mainly surface vegetation with high biodegradability; therefore, the vegetation removed before peat mining will be removed to the side. The vegetation layer is removed and put into the mined pit for the purpose of making fertilizer for the land to later grow semi-submerged *Melaleuca*.

Waste caused by workers' activities

Although the volume of daily-life solid waste generated by the workers' activities at the mine is not much, if there is no proper treatment and collection measures, it will have negative impacts on the workers' lives. The following mitigation measures are proposed to limit the negative environmental impacts caused by solid waste. The main goals include:

Minimizing the amount of domestic solid waste generated from the mine.

Reuse usable waste.

Properly collect and store waste to prevent waste from being released back into the environment by planning a proper and proper disposal site.

Planning of landfills for domestic solid waste at mines.

2.2.4. Minimize other impacts

Peat mining activities will lead to the loss of non-renewable resources, changing the environment and landscape, which are typical problems of mining projects. In practice, the environment after mining cannot be restored to its original state. However, the negative impacts of the project can still be mitigated. The general direction to propose measures to minimize the negative impacts of mining projects on the environment is:

Minimizing the operating area of the mine and auxiliary areas as well as the transportation corridor.

The progress, exploitation capacity and technology and equipment should be selected reasonably, with little impact on the background environment of the area.

Measures to protect the environment must be implemented throughout the preparation, mining and decommissioning of the mine.

2.2.5. Reducing the impact of waste grease:

The remedial objective is to ensure that project members are not harmed to their health by direct or indirect contact with waste grease. Implementation methods include:

The maintenance area is located at a certain location in the mine area and has a system to collect grease discharged from the maintenance process.

Do not bury/burn waste grease at the project area.

Waste grease is collected and stored in appropriate containers in the project area. The mining unit must sign a contract with the unit with the function of collecting and treating periodically.

Equipment and machinery that have significant oil leakage must be immediately transported from the mining area to the repair yard of the mine by specialized means and then immediately repaired the leak area.

III. CONCLUSION

On the basis of analysis and assessment of environmental impacts in the peat mining area, the following main conclusions can be drawn:

The current status of the background environment in the mine area has not been polluted in terms of air and groundwater. These are environmental indicators that allow to assess developments and changes in environmental quality in the mining area under the negative impacts of long-term mining activities.

The long-term mining process may cause some negative impacts on the environment, if there are no measures to prevent, control and treat environmental pollution. The specific impacts are:

Impact on regional landscape and natural resources.

Air pollution from mining and transportation such as noise and dust. This effect is long-lasting but local.

Possibility of surface water pollution due to exploitation and daily life of workers on the construction site. This impact is assessed at low level.

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