

Environmental impact of the Intermunicipal Multifunctional Management Consortium (CITEGEM) at the source of the Erval Novo stream

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Introduction

- Evaluate the influence of the landfill of a public consortium, located in the Northwest Region of Rio Grande do Sul / BR, on the groundwater in the area of the enterprise and on a spring located nearby.
- The possibility of the environmental impact of the landfill is an object of insecurity since Lajeado Erval Novo is the source that supplies the population of two neighboring municipalities.



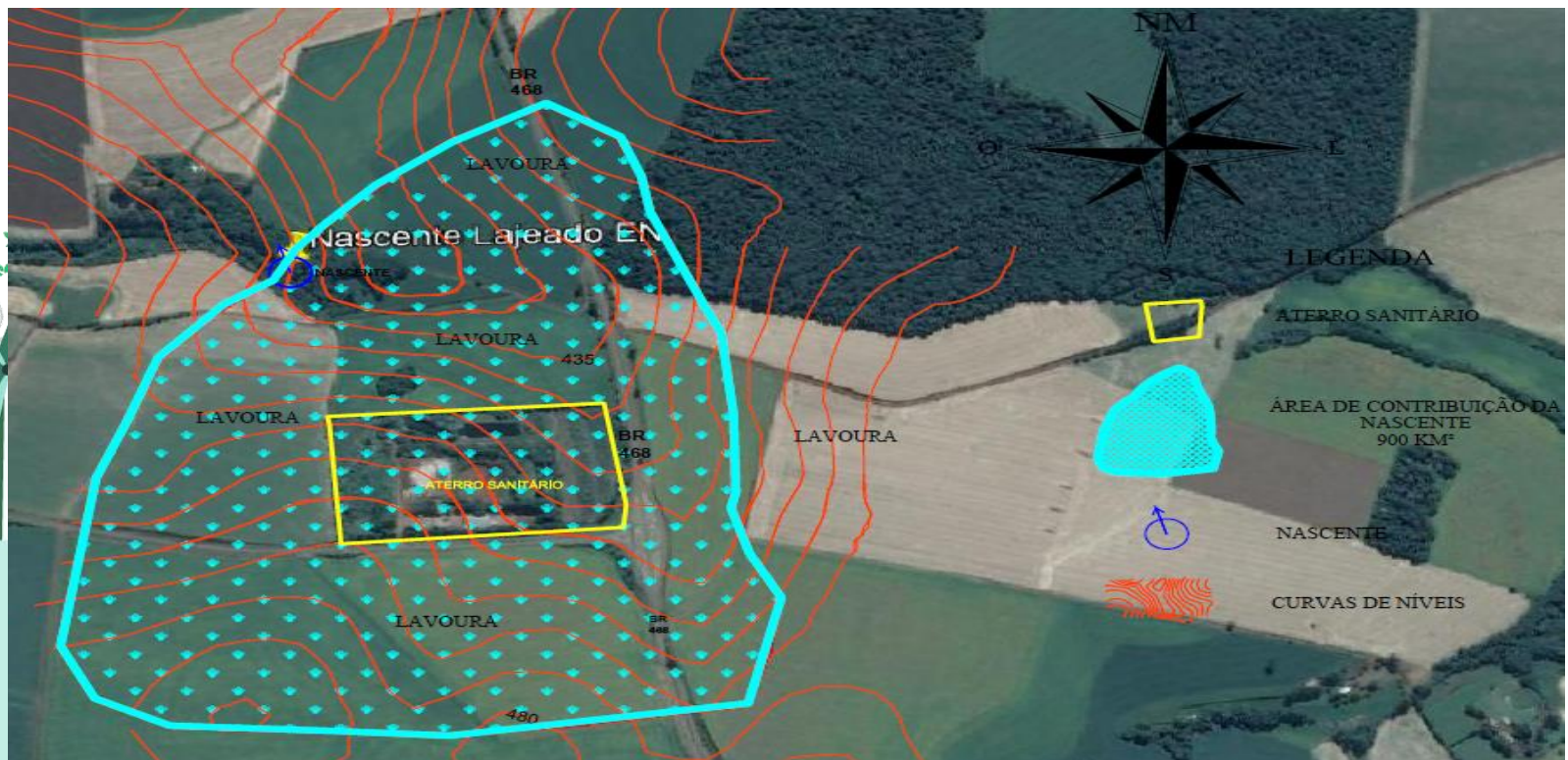
Literature review

- According to Touzani et al (2021) landfills create a leachate with complex mixtures of organic and inorganic contaminants, so that in terms of supply, it depends on the flow of polluting compounds to the groundwater, which in turn depends on the production source pollutants, their path through the soil and, therefore, functional porosity.
- Amos et al (2020) that the environmental impact assessment is an institutional process that has the potential to deliver a gradual shift towards a more environmentally conscious business practice, so that the assessment of environmental impacts can bring a better balance between the pillars of environmental development, social and economic well-being.
- According to Galli et al (2018), the transposition of the SDGs into a national public policy is essential for monitoring countries' progress towards sustainable development.



Methodological procedures

landfill location (Bom Progresso is a Brazilian municipality in the state of Rio Grande do Sul. It is located at latitude 27°32'37 "south and at longitude 53°51'57" west, at an altitude of 480 meters. It has an area of 82.8.8 km² and its estimated population in 2011 was 2 289 people.)



Methodological procedures

- water quality
- The quality of the spring water and the piezometric wells was evaluated by means of physical-chemical and microbiological tests. The choice of parameters was based on contamination indicators characteristic of waste landfills such as: chloride (HAN et al., 2020), pH (HAN et al., 2014), coliforms (GRISEY et al., 2010) and metals (MEPAIYEDA et al., 2020; HUSSEIN et al., 2021).
- Vulnerability of the local aquifer to potential landfill pollution.
- The Waste Landfill Quality Index (IQR) of the project totaled 7.5 points out of a maximum of 10 points, and, according to the classification proposed by CETESB (2019), it is in proper working condition. (is an important sanitation company in Brazil).



Methodological procedures

- The patterns detected, at some point or permanently, outside the limits of potability were aluminum, total and thermotolerant coliforms, pH and lead. According to Han et al., 2014, lead contamination may be from batteries and old lead-based paints, however, the high detection of lead in well 2 occurred in only one campaign (April / 2017). If the result is not repeatable, the possibility of analytical error can be considered, however, the indicator should continue to be monitored over time.
- The most prominent concentrations of total and thermotolerant coliforms occurred in general in the spring. It is not uncommon to detect microbiological contamination in basins occupied by agricultural activities.



- In rural areas, the main sources of water supply are shallow wells and springs, which are highly susceptible to contamination. Conboy & Gossi (2000) cite that the deposition of organic animal waste in the soil, a widespread practice in rural areas, increases the risk of contamination of groundwater. For Follmann et al. (2018), the effluent from swine activity can contribute to soil contamination, especially by the runoff that can reach water resources, negatively influencing water quality.

Methodological procedures

- The low pH of the spring water matches the pH of the groundwater sampled in the area. A study carried out by Tejada and Aguiar (2016) demonstrates that the pH around 5 consists of a natural characteristic of the groundwater in the place, which can be explained by the properties of the soil, highly weathered and acidic. Therefore, for human consumption purposes, the water captured in the spring would eventually need to have its pH corrected.
- The presence of aluminum in surface waters may be naturally occurring, the potential for releasing this contaminant through human activities such as agriculture and leaching from landfills cannot be ruled out. It is important to highlight that the presence of aluminum above the potability standard represents risks to public health, since metals in the water are absorbed by the human organism through the gastrointestinal tract. The cumulative effect of aluminum, in the long run, can cause severe encephalopathy in patients suffering from renal dialysis, which can lead to neurological disorders, among other diseases that affect the central nervous system (FREITAS et al., 2001).



Methodological procedures

- As a result of the landfill monitoring, there is an in-depth knowledge of the potential impacts of the landfill, such as the issue of aluminum and / or water acidity, which allows decision-making for the adoption of more effective projects to protect the environment. , including, to determine a direction in the compatibility between the socioeconomic development and the preservation of the environment, in order to make possible a convergence with the Agenda 2030 and to provide information to the community about its performance, importing in an environmental safety for all those interested in the functioning the landfill.



Conclusion

- The comparison between the upstream and downstream wells of the project's monitoring network did not show a dilution of contaminants diluted to the flow of groundwater at the site;
- The identification of the negligible potential for contamination of the landfill by applying the GOD-IQR index, leads to the understanding that it is feasible that contamination from the MSW landfill on surface and groundwater in the study area is not occurring;
- The aluminum concentration sometimes exceeded the potability standard, however, natural cause is pointed out as the most probable origin of the high concentration of this metal in the samples, due to the characteristics of the local soil, the same cause is attributed to the slightly acidic pH of the water collections on site;
- The presence of total and thermotolerant coliforms in all wells and in the spring equals the recurrent condition in springs and shallow wells in micro basins located in rural areas, the higher concentration in the spring can indicate interference from the addition of agricultural fertilizers such as manure. pigs, as well as can be naturally occurring;.



Conclusion

- It is understood that the geomorphological characteristics and the waterproofing of the landfills of the enterprise with HDPE geomembranes may be sufficient to contain the imminent potential of contamination of the landfill, however the monitoring and careful operation of the activity must be permanently intensified;
- The landfill must be suitable for the environment. The assessment of its environmental impacts aims to support decision-making for the implementation of sustainable projects that manage to converge between the operation of the landfill and preservation of the environment;
- The sanitary landfill is a public policy action since it treats the waste of the whole society, whether domestic, industrial and health, for example. Monitoring its operation and verifying its performance is a crucial step in the analysis of its sustainability. Considering the 2030 Agenda in landfill management drives the adoption of sustainable practices in the direction of sustainable development..



Thanks!

- “Both climate change and the COVID-19 pandemic are crises that can only be addressed by everyone together – as part of a transition to an inclusive and sustainable future,” says United Nations Secretary-General António Guterres in his new year message for 2021.
- <https://www.unep.org/news-and-stories/story/crafting-new-relationship-between-people-and-planet-2021>

