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ENVIRONMENTAL DEGRADATION ON THE CURU RIVER BANKS IN THE STATE OF CEARÁ

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ABSTRACT: The coarse sand works as aggregate in the making of concrete and mortars used as materials in the construction industry, and the clay serves as raw material for making bricks, and tiles, among other products. The following paper analyzes the environmental impact caused by the removal of coarse sand from the Curu River bed and banks and the clay used as raw material in the red ceramic industry. When the Curu River is dry or even when it still has little water in its bed, they remove the coarse sand, which is known as washed sand. The same happens on the river banks, showing that sand extraction, which is nothing more than a mining process, generates a significant environmental impact on the local flora and fauna. It was also possible to conclude that the extraction of clay on the banks of the Curu River to supply two red ceramic industries generated environmental impact, degrading the riparian forest.
Keywords: Curu River. Coarse Sand. Clay. Environmental Impact.

A DEGRADAÇÃO AMBIENTAL NAS MARGENS DO RIO CURU NO ESTADO DO CEARÁ

RESUMO: A areia grossa é usada como agregado na confecção do concreto e argamassas que são utilizados como materiais na indústria da construção civil, e a argila serve de matéria prima para fabricar tijolos, telhas etc. O presente trabalho faz uma análise do impacto ambiental gerado pela retirada da areia grossa do leito e das margens do Rio Curu, como também da argila para ser utilizada como matéria prima na indústria de cerâmica vermelha. Quando o Rio Curu está seco e quando o rio ainda está com pouca água no seu leito eles tiram a areia grossa que é chamada de areia lavada. A retirada da areia também é feita nas margens do rio mostrando assim que a extração de areia, que nada mais é do que um processo de mineração, gera um grande impacto ambiental a flora e a fauna do meio ambiente. Também foi possível concluir que a extração de argila na margem do Rio Curu para abastecer duas indústrias de cerâmica vermelha gerou impacto ambiental degradando assim a mata ciliar.
Palavras-chave: Rio Curu, areia grossa, argila, impacto ambiental.

INTRODUCTION

The Curu River Drainage Basin was divided into allotments, from Uruburetama to São Gonçalo do Amarante and the districts of Pentecoste and Canindé. The area has suffered dismemberment since the nineteenth century, changing its administrative division. Thus, Itapajé, São Luís do Curu, Umirim, and Tejuçuoca emerged from the district of Uruburetama, Paracuru and Paraipaba from São Gonçalo do Amarante, Apuiarés from Pentecoste, and Caridade, General Sampaio, and Paramoti from Canindé (Soares, 2002).

The Caxitoré River stands out on the left bank of the Curu River, which flows in a southeast-northeast direction for 195 km to its mouth. Most of its watershed is in mountainous areas, being Baturité Mountains to the East and the Uruburetama Mountains to the West (COGERH, 2020).

The illegal sand market moves R$ 13 billion per year in Brazil. In 2018, the estimated consumption of sand was around 214.2 million tons, but the actual declared production was 76.7 million tons. The remaining 137.4 million tons is the estimated amount of sand extracted illegally without authorization from the competent agencies, especially the Agência Nacional de Mineração (National Mining Agency, ANM) (Melquiades Junior, 2020).

The removal of sand happened in a district of São Gonçalo do Amarante called Cágado. However, after a local prohibition, the trucks moved to another part of the river, where communities such as Ipiranga and Vereda Funda, districts of São Gonçalo do Amarante, live. The silting of the river and the constant modification in its course represent significant damage to the environment (Soares, 2013).

An unprecedented survey reveals the impacts of the illegal extraction of sand. Environmentally speaking, the area suffers degradation, and the consequent silting-up causes disasters and death in the flood periods of the shallow and wide rivers. From the social aspect, sand trafficking enriches a few people and preserves the majority in misery once they remove grains to raise their families. Due to the subsequent exclusion, they become participants in environmental crime in Brazil (Melquiades Junior, 2020).

This manuscript analyzes impacts generated on the Curu River due to the extraction of coarse sand used in constructions and the clay that serves as raw material for the red ceramic industry.

METHOD

The work consisted of onsite visits to the Curu River in the municipalities of Paraipaba (near the river mouth) and São Luis do Curu (about 30 km from the river mouth) in Ceará, seeking the impacts generated by the extraction of coarse sand and clay along the river banks. Photographies and literature reviews were helpful to the development.

THE EXTRACTION OF SAND AND CLAY IN THE CURU RIVERBANK

Estimating the amount of sand used in construction is possible by knowing the amount of cement produced and consumed in a country since sand is a constituent of concrete. If the concrete mix is of the type one-two-three, it will require one part of cement, two of sand, and three of gravel. Water and additives are also components in the manufacture of concrete and mortar.

Figure 1 shows that the Curu Riverbed is wider between the municipalities of Paraipaba and Paracuru, near its mouth with little water. About 150 m far from the right riverbank, in Paraipaba, there is a red ceramic industry that removes the clay from there. Still shown in Figure 1, the extraction of coarse sand and clay has destroyed almost all the riparian vegetation on the riverbanks, increasing the silting-up and further narrowing the riverbed, changing the river course.

Figure 1 - The Curu Riverbed is wider between the municipalities of Paracuru and Paraipaba near the mouth of the river with little riparian forest.

The existence of two brickworks on the Curu Riverbanks is because of the significant amount of clay, which is the raw material to make bricks. Figure 2 shows the chimney of a brick factory on the Curu Riverbank in the municipality of São Luís do Curu. After the railway bridge over the Curu River, it is possible to see the lack of riparian forest in the whole area. The second factory is in Paraipaba, near the Curu Riverbank as well. It is worth mentioning that both of them have caused environmental impacts.

The people who extract sand from the Curu River have built a road inside the riverbed so that the trucks loaded with coarse sand can travel to the extraction site. Figure 2 shows this situation while the water flows on the right side of the Curu Riverbed in the municipality of São Luis do Curu.

Figure 2 – Chimney of a red ceramic industry on the left side and the Curu River without the riparian forest.

Figure 3 shows a deforested area on the left bank of the Curu River, about 150 meters from the center of the town of São Luis do Curu. It is possible to see a fenced area and a dirt road inside the riverbed.

Figure 3 – Deforested area on the left bank of the Curu River.

Figure 4 shows the reinforced concrete bridge in the municipality of São Luis do Curu, on the road over the Curu River on the BR-222, with its infrastructure and superstructure. There was a bridge erected during the construction of the first stretch of road still unpaved, but it gave way to the current one. The existence of a riparian forest near the head of the bridge means that the coarse sand – a component of concrete and mortar – and clay – raw material to make bricks and tiles – are still untouched.

Figure 4 - Reinforced concrete bridge on the highway over the Curu River.

A São Luis do Curu dweller says the sand extraction near the city has degraded the Curu River. Indeed, the removal of sand and clay for the construction and red ceramic companies on the Curu Riverbanks has generated environmental impacts – the removal of coarse sand and clay – on the ecosystem, destroying flora and fauna.

CONCLUSION

The Curu River in the State of Ceará has suffered environmental damages by the degradation of its riparian forest and the removal of coarse sand used in the construction company and clay as raw material in the red ceramic company to make bricks.

The coarse sand comes from the Curu Riverbanks and Riverbed, areas that do not have rigid supervision by the Superitendencia Estadual do Meio Ambiente do Estado do Ceará (Superintendence of the Environment of the State of Ceará, SEMACE).

Removing coarse sand and clay has been increasing the silting-up of the Curu River and even more the width of the riverbed, changing its course.

The Curu River is a significant source for its region, whose preservation requires rigid inspection by public agencies and more incisive environmental education.

The area where the Curu River least degrades its riparian forest is near the reinforced concrete bridge in the municipality of São Luis do Curu.

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