Hydrological dynamics of rivers under the influence of mining activities and climate disturbances: the case of the Cavally River within the mining area of the Ity mining company in Zouan-Hounien (West, Côte d'Ivoire)

(Oral communication)

Epse TOURE Affoué Berthe YAO[1*], Bérenger KOFFI[2]; Loukou Alexis BROU[1], Ehui Serge Donald MISSA[1] & Kouakou Lazare KOUASSI[1]

[1]*Jean Lorougnon Guédé University, Laboratory of Environmental Science and Technology, Daloa, Côte d'Ivoire*
[2] *Institut National Polytechnique Félix HOUPHOUËT-BOIGNY, Yamoussoukro, Côte d'Ivoire*

**Corresponding author: Epse TOURE Affoué Berthe YAO : y.berth22@gmail.com*

ABSTRACT

Mining activities conducted near and in riverbeds generally disturb their flow regime and often the life of aquatic organisms. This is the case of the Cavally River, a transboundary river shared by Guinea, Côte d'Ivoire and Liberia, which is experiencing severe disruption to its bed due to mining activities. The main objective of this work is to analyse the hydromorphological evolution of the Cavally River in Zouan Hounien. The methodological approach is based on field visits, cartographic studies using satellite images, and measurements of flow velocities and discharge rates at the Ity-SMI station. The results show that gold panning activities have a considerable impact on the banks of the Cavally River in the vicinity of the Ity mining company. We observe an extension of the width of the bed which increased from 20.1 m (2007) to 54.82 m in 2017 then to 180.73 m in 2022; either an extension of 160.63 m. Erosion caused by gold panning activities has disrupted the flow velocity of the river. The periods of high and low water remain unchanged. However, in 2021, there has been a significant drop in water levels at the Ity-SMI station. The average water level, which was 3.2 m, fell to 0.87 m. There was also a sharp drop in flow rates in December 2020 (low water), from 73.58 m3/s to 1.54 m3/s. The flow rates recorded before the channels were built are lower than those recorded after construction. At the Bakatouo and Walter channels, the pre-construction flow rates are slightly higher than those recorded after integration. However, at the Daapleu and Colline Sud channels, the initial flow rate data are lower than those recorded after integration of the diversion channels. Regular monitoring of river dynamics and strict supervision of gold panning activities will help to better preserve the river. It is also preferable to guide local communities towards socio-economic activities that are compatible with environmental protection and water quality.

Keywords: Mining activities, Riverbed, Morphology, Cavally River, Côte d'Ivoire