

## CHARACTERISTICS OF POLLUTION AND ECOLOGICAL RISKS ASSOCIATED WITH HEAVY METALS IN THE FUYANG RIVER IN CHINA

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**Abstract:** Fuyang River, located in Hebei Province, with a rapid economic development pace in recent years, is a typical watershed with water shortage and uneven water resource distribution in North China. It covers a total area of 22814 km<sup>2</sup>, and its full length measures 402 km. This river is characterized by sluggish flow throughout the year, and it often cuts off in some reaches. More than 19 million people reside in this area, and the cultivated area measures approximately 1666.7 thousand hectares. Economy is developing rapidly in this area, which boasts more than 90 tanneries, 43 steelmaking plants, 136 electroplating enterprises, 94 thermal power enterprises, and 208 cement plants. These bases discharge urban, industrial, and agricultural wastes through numerous drainages. More than 500 million tons of waste water is drained into the Fuyang River annually, either as is or after slight treatment. Therefore, the Fuyang River basin is the most polluted one with high levels of chemical oxygen demand and ammonia nitrogen in the Hebei Province. As a result of rapid industrialization and economic development, heavy metals contaminate this area as well. To analyze the pollution characteristics and to assess the potential ecological risks associated with heavy metals in the Fuyang River, surface sediments were collected from 66 sampling sites (as shown in above figure) elected according to their river structure, hydrological conditions and the distribution of drainage outlets of sewage along the river. The sediment samples were analyzed for concentrations of Cr, Ni, Cu, As, Cd, Pb, Zn, Hg, Co, Sn, Se, and Mn using inductively coupled plasma-mass spectrometry. Cr, Ni, Cu, As, Cd, Co, and Sn were accumulated in the river reaches of Xingtai City, as per the geoaccumulation index and Pearson's correlation analyses. In particular, Cr accumulates strongly in Shaocunpai and in the upstream of the Fuyang River. In the midstream and downstream of the river, potential ecological risk is low, while Yongnian County reach exhibits very high ecological risk mainly caused by Cd and Hg.

