Heavy Metal Contamination of Soils From Sugarcane Farming: How Safe Is the County Park?

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In the state of Hawaii, large areas of land contain contaminated soils due to sugar cane plantations from the plantation era. This era impacted Hawaii's soil as the plantations used many heavy metal based pesticides to protect their sugar cane crops .The purpose of this science fair project was to go and test an untested county park located on old sugar cane farming land and see if it contained arsenic, lead, or other heavy metals from operations, which could pose a health risk. The original question was which heavy metals will be found in high concentrations, if the soil from a former plantation area is tested? The hypothesis to answer this question was if soil samples were collected from an untested county park, then they would contain arsenic and lead, because the park used to be located on a sugar cane plantation that likely used heavy metal based pesticides. Soil samples were collected from the county park using a sampling plan made with a Technical Guidance Manual. Samples were collected at Decision Units (DUs) using a triplicate method and were dried. The samples were analyzed using an Energy Dispersive X-Ray Fluorescence machine, which could quantify the amounts of heavy metals in a soil sample. The results and data showed there was in fact arsenic and lead contamination occurring on the left side of the county park. There was also a significant positive correlation between the metals Arsenic, Lead, and Zinc found. The hypothesis was supported because DUs were recorded having up to 182 ppm of Arsenic and 223 ppm of lead. A recommendation to improve the project would be to take more samples from the park to collect more data. Finally, a new question about this topic for a future project would be about what plants work for remediating contaminated soils.

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