Heavy metal contamination of agricultural soils around a chromite mine in Vietnam

Kien C.N., Noi N.V., Son L.T., Ngoc H.M., Tanaka S., Nishina T., IWasaki K.

United Graduate School of Agricultural Sciences, Ehime University, Ehime 790-8566, Japan; Faculty of Chemistry, Hanoi University of Science, Hanoi, Viet Nam; Graduate School of Kuroshio Science, Kochi University, Kochi 783-8502, Japan; Faculty of Agriculture, Kochi University, Kochi 783-8502, Japan

Abstract: In Vietnam, the Co Dinh mine is the largest chromite mine in the country. Mining, ore dressing and disposal of the tailings provide obvious sources of heavy metal contamination in the mine area. The present study examined the influence of chromite mining activities on the adjacent lowland paddy field by investigating heavy metal and As levels in the mine tailings, sediments, paddy soils and water. At paddy fields located near the mine tailings, the total contents of Cr, Co and Ni were 5,750, 375 and 5,590 mg kg^{-1}, and the contents of their water-extractable form were 12.7, 1.16 and 32.3 mg kg^{-1}, respectively. These results revealed severe contamination of lowland paddy soils with Cr, Co and Ni as a result of mining activity, suggesting serious health hazards through agricultural products, including livestock in this area. The principal source of the pollution was sediment inflow owing to the collapse of the dike, which was poorly constructed by heaping up soil. Moreover, water flowing out from the mining area was also polluted with Cr and Ni (15.0-41.0 and 20.0-135 ?g L^{-1}, respectively). This might raise another problem of heavy metal pollution of watercourses in the area, indicating the need for further investigation and monitoring of fluctuations of water quality with seasonal changes. ?? 2010 Japanese Society of Soil Science and Plant Nutrition.

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Correspondence Address: Kien, C.N.; United Graduate School of Agricultural Sciences, Ehime University, 3-5-7, Tarumi, Matsuyama, Ehime 790-8566, Japan; email: chungockien@hotmail.com
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Authors with affiliations:

1. Kien, C.N., United Graduate School of Agricultural Sciences, Ehime University, Ehime 790-8566, Japan
2. Noi, N.V., Faculty of Chemistry, Hanoi University of Science, Hanoi, Viet Nam
3. Son, L.T., Faculty of Chemistry, Hanoi University of Science, Hanoi, Viet Nam
4. Ngoc, H.M., Faculty of Chemistry, Hanoi University of Science, Hanoi, Viet Nam
5. Tanaka, S., Graduate School of Kuroshio Science, Kochi University, Kochi 783-8502, Japan
6. Nishina, T., Faculty of Agriculture, Kochi University, Kochi 783-8502, Japan
7. IWasaki, K., Faculty of Agriculture, Kochi University, Kochi 783-8502, Japan

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