3937338 ENRD/M : MAJOR : TECHNOLOGY OF ENVIRONMENTAL PLANNING FOR RURAL DEVELOPMENT ; M.Sc. (TECHNOLOGY OF ENVIRONMENTAL PLANNING FOR RURAL DEVELOPMENT)
KEY WORDS : DISTRIBUTION / CADMIUM / ZINC / SOIL / ZINC MINING ACTIVITY
PRAYUT SOMBOON : DISTRIBUTION OF CADMIUM AND ZINC IN SOIL FROM ZINC MINING ACTIVITY : A CASE STUDY OF ZINC MINE, MAE SOT DISTRICT, TAK PROVINCE. THESIS ADVISORS : CHALIE NAVANUGRAHA, Ph.D., PONGPIT PIYAPONG, M.Sc., NITAYAPORN TONMANEE, M.S.N.S., 121 p., ISBN.974-662-999-9

The purpose of this research is to study the distribution of cadmium and zinc in soil from zinc mining activity. The analysis of soil contamination with cadmium and zinc was done in 3 areas : the upstream and downstream areas, located in the same watershed as the zinc mine, and the adjacent area outside the watershed boundary. The amount of contamination within watershed boundary was statistically compared to the nearby zone by T-Test and then the results were compared by the accepted standard of maximum contamination of cadmium and zinc in soil used for agricultural activities in European Union (EU). Since some soil properties influence the available form of cadmium and zinc, the analysis of correlation between soil properties and the amount of available form was also carried out.The topography and environment involved such as slope, drainage pattern and land use characteristics were studied. Findings were applied to support alternatives for pollution management.

The results reveal that the total cadmium and zinc contamination in the downstream area was an average of 50.84 ppm and 1,908.81 ppm, respectively, which was higher than that in the upstream area (0.93 ppm and 37.94 ppm) and in the adjacent area (1.09 ppm and 42.14 ppm). According to the differences among the sampling areas, it was found that the amount of cadmium and zinc in the downstream area differed from the amounts in the other 2 areas at the statistically significant level of 0.05. Regarding the EU accepted standard of maximum contamination in cultivated land , the actual average of cadmium and zinc was statistically different from the standard at the significant level of 0.05. The average in the downstream area was higher than the standard, while the other 2 areas were lower. It can be concluded that zinc mining activity distributes cadmium and zinc into the watershed, especially the downstream area, by water transportation. According to the analysis of correlation between soil properties which consist of pH, soil texture, soil moisture, organic matter (OM) and cation exchange capacity (CEC), and available form of cadmium and zinc, it is found that pH in the downstream area, which has the highest contamination, has a positive correlation with the amount of zinc at the level 0.500. Conversely, soil moisture has negative correlation with available form of cadmium with the coefficient of correlation at $-0.390 (p<0.05)$.

Due to the results, two alternatives for the management of soil pollution are proposed as follows. 1) For the management of land and water from mining activity, it is recommended that roof be constructed to cover stockpile and gangue minerals, and that the surrounding area be fenced in order to protect the stockpile and gangue minerals from beingdrained by rainfall. 2) The mitigation of soil pollution can be carried out by increasing pH in the uncultivated land, while cultivated land should have organic matter added in order to reduce the solubility of cadmium and zinc, or the land should not be planted with root crops or edible crops.