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Current situation of heavy metal-pollution in developing country

Yusei Masaki, Tsuyoshi Hirajima, Keiko Sasaki, and Naoko Okibe

Department of Earth Resources Engineering, Kyushu University, Fukuoka 819-0395, Japan

Abstract

Heavy metal pollution has been recognized as one of the most crucial problems, in particular in industrialized countries. The problem is generally caused by human activities, such as mining operation, industrial operation, and etc., since various kind of heavy metal species including highly toxic pollutants for human health, are often dealt with during processes in these operations. Developing countries often attach weight to industrial development, but not to treatment of environmental pollution, since increase in national GDP, followed by development of industry, is generally a top priority of a nation. Therefore, new way of thinking or novel system to realize a high economic growth without environmental pollution is necessary. In order to achieve to construct such kind of system, current situation of heavy metal pollution in China, was reviewed in this study, since China is, today, one of the representative developing countries which have a lot of serious environmental problems.

1. Introduction

In Recent years, heavy metal-polluted environments have been recognized as one of the most important problems, especially in highly industrialized countries. The major causes of heavy metal emission to the environments are the artificial activities, in particular acid mine drainage from mining operation and waste water from industrial factory.[1][2] Heavy metal pollutants often remain in the mining field for over 50-100 years even after mining activity has been over, which causes serious negative effect on environmental eco-systems. In the case of industrial waste water, it may accidentally leak to surrounding soil, river and ground water environments, from industrial factories which deal with relatively concentrated heavy metals and then manufactures metal-containing and other related products. For example, in Japan, Minamata disease was found in 1956, as one of the most serious heavy metal pollutions. It was caused by eating fish and shellfish that polluted by industrial waste water containing mercury (Hg) compounds in Minamata bay. In Constantí, Spain, waste water containing several major heavy metals, such as lead (Pb), Hg, chromium (Cr), cadmium (Cd), and arsenic (As), leaked into atmosphere, ground water, and soil, near a new hazardous waste incinerator.[3] In China, a number of inorganic and organic pollutants have caused environmental pollution problems for the last 20 years. More than 1.5 million sites of heavy metal exposure in China, have been confirmed in 2011, according to the national census of environmental pollution. Developing countries tend to focus on only development of industry, but not on treatment of environmental pollution. However, both of them are generally necessary for a nation.

2. Objectives

Industrial development is generally one of the important factors to realize a high economic growth in every country, however it often causes environmental pollution problems, such as heavy metal contaminated-waste water by illegal discharging from chemical factories and acid mine drainage problems. It might seem to be difficult to achieve balanced coexistence of industrial development and treatment of environmental pollution especially during the period of a high economic growth even though it is obvious that polluted environments indirectly give a negative effect on future increase in GDP. Therefore, new way of thinking or novel system to realize a high economic growth

without environmental pollution should be established. In order to achieve to construct such kind of system, current situation of heavy metal pollution in China, was reviewed in this study, since China is, today, one of the representative developing countries which have a lot of serious environmental problems.

3. Current situation of heavy metal-polluted environments in China

These heavy metals; Hg, Cd, Cr(VI), Pb, and As, were classified to critical heavy metal pollutants in China by China environmental statistical yearbook published by Ministry of Environmental Protection in China (MEPC). The above five pollutants were also categorized as strong human carcinogens by the International Agency for Research on Cancer, World Health Organization. Chinese government has continuously struggled to solve heavy metal contamination problems in industrial sectors over the past 20 years. However, pollutions in agricultural areas derived from mining operations and their ruins have recently been concerned by Chinese people. Many people having an awareness of the problem had requested of the government to publish environmental survey data. Then, it had been ordered by the State Council in China, and published by MEPC on April 17th, 2014. According to the survey, approximately 30% of building areas involving in mining industry and industrial operation including steel, non-ferrous metal, leather, papermaking, oil, coal, medicine, chemical fiber, mineral product, metal product, electricity, and metallurgy, were found to be polluted by some kind of pollutants, such as Cd, Pb, Hg, Zn, As, and other organic pollutants. Moreover, environmental pollutions especially in soil were observed in other areas, such as agricultural, forest, grassland, and unused area. In particular, the pollution level in agricultural area was higher than that in others. Since pollution at agricultural field directly links to human health, the fact should be recognized as one of the most critical environmental problems. Chinese government stated that the major cause of spreading of pollution would be secondary contamination. There is no specific rule and law to control grade of soil to be utilized for agricultural industry, resulting in a situation that large amount of contaminated soil derived from industrial areas might be used for agriculture in rural area of China. In order to prevent to spread environmental pollution as this case, awareness of people in production firms and manufactures should be changed, and they should continuously pay attention to environmental factors for human health and also protection of nature.

4. Conclusion

Heavy metal pollution problems in China have become serious in these 20 years, mainly caused by large scaled-mining operation and rapid industrial development. One of the problems which often make environmental remediation in developing countries leave is a cost since treatment of polluted water and soil takes costs for its initial investment, operation and maintenance. MEPC has continuously published online a number of nationwide plans focused on human health and nature protection, which would lead to industrialized society without heavy metal pollution problems.

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Email: y-masaki11@mine.kyushu-u.ac.jp