

CHAPTER I

INTRODUCTION

1.1 Background of the Problem

The International Water Management Institute (IWMI) and the Thai Department of Agriculture (DOA) had conducted a research on cadmium contamination in soils and rice grains from a small agricultural area of Mae Sot District, Tak Province during 2001-2003 (Figures 1.1 and 1.2). The chemical analyses of cultivated soil along the south of Mae Tao creek revealed significantly high levels of cadmium contamination. This creek is located in the drainage system downstream to the west of two mines. It is composed of several tributaries that mainly flow from east to west. A detailed investigation on paddy soil and stream sediments around the Mae Tao creek and the Mae Ku creek to the south was carried out by the National Research Center for Environmental and Hazardous Waste Management (NRC-EHWM) in 2004 which the results also show relatively high total cadmium content in many of the soils sediment and rice samples. Hence, the government initiated a medical surveillance program to evaluate the cadmium level in local people. Blood and urinary tests indicated that local residents in some particular areas have positive test for high cadmium content in their bodies (Tak Hospital, 2004).

This Mae Sot District has been well known not only as a high-quality jasmine rice producing area but also as a largest zinc mine of the country. However, impact from zinc mining has been decried to hold responsibility for the cadmium contamination in soil and hence in rice. The problem of cadmium contamination in Mae Sot has been raised intensively and continued incessantly by several organizations, government agency and other institutions. This issue is not just a local problem but a national concern, which is currently drawing an interest from several international organizations as well. The government has annually compensated the local farmers for the cessation of rice farming with more than 49.98 million baht since 2005. Therefore, it is very important to clarify and quantify the cadmium-

contaminated area in this district in order to plan for mitigation and remediation of this site.

This is the spatial dimension problems which become a threatening issue that directly impacts the environment and human health in Mae Sot area; therefore, an interactive, effective and systematic framework for environmental and mineral resource management in this contaminated area is necessary to be established.

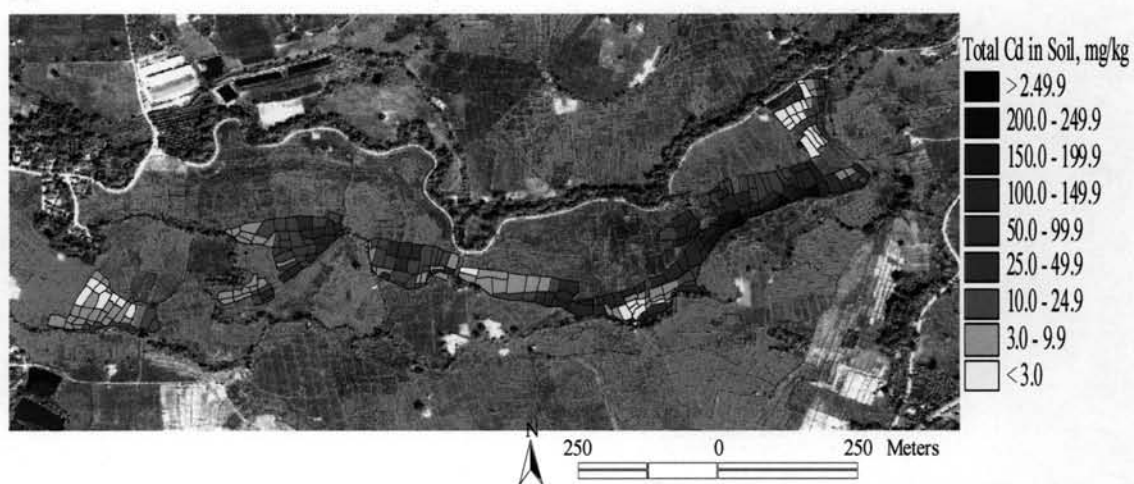


Figure 1.1 Levels of total cadmium in soil from Mae Tao floodplain, Ban Mae Tao Mai, Mae Sot district, Tak province, reported by IWMI (2003).

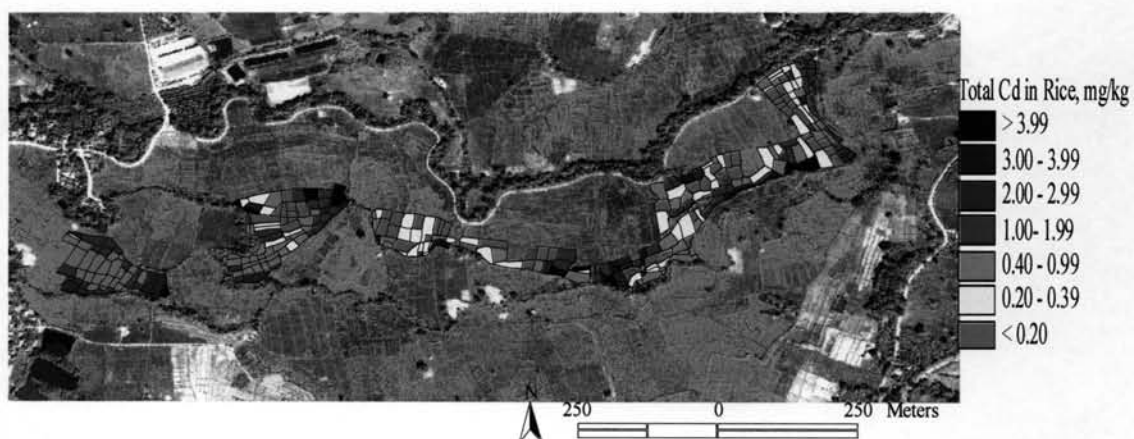


Figure 1.2 Levels of total cadmium in rice grain from paddy fields around the Mae Tao floodplain, Ban Mae Tao Mai, Mae Sot district, Tak province, reported by IWMI (2003).

1.2 Objectives of the Study

The main objective of this project is to apply the Geographical Information System (GIS) as decision-making tool for zinc utility and environmental management in the vicinity of zinc deposits in Mae Sot District of Tak Province. Sub-objectives are specified to reach the goal as follows:

1. To create a database systematically using the GIS application.
2. To draw a potential zoning of the cadmium-contaminated area using the database.
3. To identify the causes of contamination using spatial analysis based on the database.

1.3 Scope of the Study

The GIS was applied to the whole area of Mae Moei River in Mae Sot District, which covers seven sub-catchments. General information was arranged into a GIS layered format. However, the study area was focused on Mae Tao and Mae Ku sub-catchments extending from the eastern mountainous area to western alluvial plains.

Secondary data containing chemical analyses, land use, plants, soil type, geology, rainfall, etc. were arranged and inputted into the GIS format. In addition, satellite images were processed and interpreted before sending them into the same format. All available data were integrated, analyzed, evaluated and interpreted via the GIS. Consequently, an effective management plan area were created and published.

1.4 Expected Results

The expected result of the study is to establish an interactive, effective and systematic framework for environmental and mineral resource management in a zinc deposits area.