

Coping with Groundwater Contamination in Urban Areas - A Case Study of Hadano, Kanagawa Prefecture, Japan

Takahiro Endo¹

1. College of Sustainable System Sciences, Osaka Prefecture University, Osaka, Japan

E-mail: tte23042@osakafu-u.ac.jp

Abstract. Groundwater contamination by volatile organic compounds in urban areas of Japan has been gaining increasing attention since the 1980s. This presentation focuses on the city of Hadano in Kanagawa prefecture, Japan, which has pioneered countermeasures against groundwater pollution. The case of Hadano clearly shows policy issues specific to groundwater contamination while demonstrating who should take responsibility for purification and how to finance it. Hadano solved these problems by enacting an innovative local ordinance with three pillars; a retroaction system, proxy purification by the city mayor, and fundraising for purification activities. The case of Hadano is very useful to policy makers because these problems are likely to occur in other urban areas in the near future.

Keywords: tragedy of the commons, stock contamination, retroaction, proxy execution

1. Introduction

Hadano, Kanagawa prefecture, Japan is a small city with an area of 103.76 km² and a population of about 0.16 million. Approximately 70% of the drinking water used in the city originates from groundwater. In 1989, it was disclosed that water in Kouboh spring, a representative spring in

Hadano had been contaminated by tetrachloroethylene. A city-wide groundwater survey was then conducted, which revealed that 8 km² along the Mizunashi River was so heavily polluted that some drinking water wells had to be abandoned



Kouboh spring
Mizunashi River

(Figure 1) ^[1].

Figure 1: Map of Hadano city

2. Soil as a waste receptacle

Natural soils are often used for waste disposal, especially when there are no regulations. In such cases, disposal of contaminants in soil is considered a rational and inexpensive solution to waste disposal. However, when large numbers of people engage in such behavior, groundwater contamination occurs, which is irrational from a social point of view. Under such conditions, groundwater contamination can be referred to as a “tragedy of the commons” [2].

3. Countermeasures implemented by the City of Hadano

In 1994, Hadano enacted a local ordinance for prevention of groundwater contamination and its purification. This ordinance is considered to be a pioneering one that dealt with groundwater contamination in urban areas in Japan. The local ordinance referred to the Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund, of the United States, but was tailored to Hadano’s economic and social backgrounds. The ordinance has three pillars: a retroaction system, proxy purification by the city mayor and fundraising for purification activities. Hadano promoted purification based on this ordinance and finally declared the Hadano springs to be remediated in 2004^[3].

4. Conclusions

The case of Hadano clearly shows policy issues specific to groundwater contamination. The first issue is who should take responsibility for purification. It is not always possible to determine who is responsible for groundwater contamination, particularly because there is often a time-lag between the original pollution and groundwater contamination. Accordingly, applying the polluter-pays-principle to a case of groundwater contamination may hinder remediation because the contaminants will be left untouched if the responsible party cannot be identified. Another issue that must be addressed is financing remediation. This problem emerges where the polluter cannot be found or cannot afford to pay for cleanup. Hadano’s experience is very useful to policy makers because these problems are likely to occur in any places that face groundwater contamination.

References

- [1] Nagayama, K. On local ordinance on prevention of groundwater contamination and its purification in Hadano city, *Current Laws*. 1486, 65–81 (1994) (in Japanese).
- [2] Hardin, G. Tragedy of commons, *Science*. 162, 1243-1248 (1968).
- [3] Otsuka, T. Cost sharing on soil purification in urban area with special reference to local ordinance on prevention of groundwater contamination and its purification in Hadano city, *Jurist*. 1040, 95-105 (1994) (in Japanese).

