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Groundwater basin management based on monitoring system -Groundwater level and land subsidence, Kanto Groundwater Basin in Japan

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Over 40 million people live on and exploit the groundwater resources of the Kanto Plain. The Plain encompasses metropolitan Tokyo and much of Chiba Prefecture. Useable groundwater extends to the base of the Kanto Plain, some 2,500 to 3,000 m below sea level. Much of the Kanto Plain is at sea level. By the early 1970s, with increasing urbanization and industrial expansion, local overdraft of groundwater resources caused major land subsidence and damage to commercial and residential structures as well as to local and regional infrastructure. Subsidence is now more than 4m in Tokyo, and groundwater levels were more than 60m below sea level in early 1970s [1]. Indeed, some lowlands around Tokyo are now below sea level. Particularly affected are the suburbs of Funabashi and Gyotoku in western Chiba. The national and local governments began control of groundwater use in early 1970s. As a result ground water levels rose to -20m sea level; and the subsidence was substantially reduced and actually locally rebounded in Tokyo and surrounding area. Regulations in Kanto area, mainly by local government, led to installation of about 500 monitoring wells and almost 5000 bench marks by the 1990s [2]. The monitoring systems are expensive to maintain, but the resulting data provide continuous measurement of the “health” of the Kanto Groundwater Basin, permitting sustainable use of the groundwater resource.

References:

[1]Nirei H and Furuno K (1986) Recent Progress of Quaternary Research in Japan 11 71-80

[2] Furuno K et al. (2015) Proc. IAHS, 372, 53-57

