

Sustainable Use of Laura Lens during Drought

Authors : Kazuhisa Koda, Tsutomu Kobayashi

Abstract : Laura Island, which is located about 50 km away from downtown, is a source of water supply in Majuro atoll, which is the capital of the Republic of the Marshall Islands. Low and flat Majuro atoll has neither river nor lake. It is very important for Majuro atoll to ensure the conservation of its water resources. However, up-coning, which is the process of partial rising of the freshwater-saltwater boundary near the water-supply well, was caused by the excess pumping from it during the severe drought in 1998. Up-coning will make the water usage of the freshwater lens difficult. Thus, appropriate water usage is required to prevent up-coning in the freshwater lens because there is no other water source during drought. Numerical simulation of water usage applying SEAWAT model was conducted at the central part of Laura Island, including the water-supply well, which was affected by up-coning. The freshwater lens was created as a result of infiltration of consistent average rainfall. The lens shape was almost the same as the one in 1985. 0 of monthly rainfall and variable daily pump discharge were used to calculate the sustainable pump discharge from the water-supply well. Consequently, the total amount of pump discharge was increased as the daily pump discharge was increased, indicating that it needs more time to recover from up-coning. Thus, a pump standard to reduce the pump intensity is being proposed, which is based on numerical simulation concerning the occurrence of the up-coning phenomenon in Laura Island during the drought.

Keywords : freshwater lens, islands, numerical simulation, sustainable water use

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