Case Study Detail Record

Organization type: Government

Name of Ministry/Agency:

Country: Marshall Islands

Initiative Title: Groundwater Supply on the Marshall Islands

Internet links:
http://www.sidsnet.org/docshare/other/20031105153112_CUBA.ppt
http://www.sidsnet.org/docshare/other/ 20031105152734_CUBA.CASE_STUDY2.doc
http://www.olemiss.edu/sciencenet/saltnet/swica2/Lara.pdf

Scope:
National:
- Marshall Islands

Status: Completed

Timeframe: *Start:* 2002 *End:*

Stakeholders/Partners:

Relevent issues: - Safe Drinking Water

Objectives/Challenges:

To prevent contamination of the freshwater supply by saltwater

Lessons Learned:

Key factors for success

• For sustainable use of the scavenger well it is crucial to monitor salt contents of the withdrawn water. In order to prevent freshwater depletion of the well, pumping speeds have to be regulated carefully.
• In order to guarantee long term sustainable use of the wells, an automatic weather station needs to be installed. With a weather station it will be possible to establish the relationships between rainfall, groundwater level and salinity when water is abstracted.

• The existence of usable freshwater lenses at new drilling sites is very uncertain. Because of this the applicability of scavenger wells was mainly demonstrated with existing wells
• Some wells are not suitable for the scavenger well technique because of depth limitations that restrict access for properly positioning the intake for the scavenger and production wells.
Sustainability and Transferability

The technique has successfully been demonstrated in different locations. Since the technique is relatively simple, it is a potential solution against saltwater contamination of freshwater lenses in a wide range of coastal regions. However finding suitable spots for the scavenger well technique requires testing and analysis. Lenses develop where topological and geological conditions permit: where the underlying rock is sufficiently permeable to allow rainwater to percolate underground, but not so porous that the infiltrated rainwater immediately drains to the sea without forming lenses.

Policy Options:

As in many Small Island Developing States the availability of sufficient fresh water is a major concern for the Republic of the Marshall Islands (RMI). Since the Marshall Islands lack the financial and technical resources to implement seawater desalination for all their population, efficient sustainable freshwater recovery from groundwater has been an elusive goal. Since simple abstraction of freshwater from thin groundwater lenses, typical in oceanic atolls, often results in upward coning of saltwater, which in turn causes contamination of the water supply, a new welling procedure was required.

Summary:

With the help of the United Nations and the North American National Weather Service (part of the National Oceanic and Atmospheric Administration, NOAA) a new scavenger technology for wells has been introduced. This technique is an inexpensive practical solution to prevent upward coning and contamination by saltwater when groundwater is withdrawn. In 2002 a UN DESAmission to Majuro in the RMI was conducted to demonstrate the applicability of scavenger wells in optimizing fresh groundwater recovery from thin freshwater lenses residing in oceanic atolls.

Outcomes

-- The scavenger well technique proved to be of great help against saltwater contamination of withdrawn freshwater in three different test locations. In the Delap intersection well the chloride concentration went down from 400 to 250 mg/L; In the MALGOV well the chloride concentration went down from 225 to 175 mg/L; in the Iroij well the chloride concentration went down from 472 to 133 mg/L (according to the international standard for potable water, water should contain 250 mg/L chloride or less).
-- At the MALGOV well with the use of scavenger technique it was possible to
withdraw water at higher speeds than without the scavenger technique.
-- The water pumped from the scavenger well can be used for other purposes where
water salinity is not an inhibiting factor (swimming pools, toilets etc.)