

Declining groundwater level of the Minjur Aquifer, Tebrak area, Saudi Arabia

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The 1980s saw a rapid expansion in irrigated agriculture in Tebrak area of Central Saudi Arabia. Wheat production was expanding especially rapidly because of the government policy to buy at advantageous price all wheat offered for sale. This placed large demands on the water resources in the Minjur Aquifer, resulting in an imbalance between water recharge and water discharge. As a result, water level in the aquifer has fallen in this area. The use of groundwater has been inefficient and in future it requires proper management that answers the questions of when to use water, how much to use, how to use it, and evaluates the purpose for which it is being used.

KEY WORDS: Saudi Arabia, Minjur Aquifer, Tebrak area, groundwater.

SAUDI ARABIA is an arid region that has no perennial streams. Therefore, groundwater is the main natural water resource. Two types of aquifer have been identified in the country; the shallow alluvial aquifers along wadi systems sometimes underlain by weathered bedrock, and deep rock aquifers, usually sandstone and limestone. The shallow alluvial aquifers are generally unconfined, narrow and long, small in area, and their water tables fluctuate rapidly in response to local precipitation and discharge. The deep rock aquifers are generally confined, and with the exception of outcrops, large in area and contain mainly fossil groundwater (Beaumont, 1981).

The Ministry of Agriculture and Water with the help of international companies has conducted hydro-agricultural studies covering the whole kingdom. The results of the investigations have indicated that there are nine main deep aquifers; Wajid, Saq, Tabuk, Minjur, Biyadh, Wasia, Umm Er Radhuma, Dammam and Neogene, listed in order from old to young (Ministry of Agriculture and Water, 1984).

Analysis of water samples from these large confined aquifers revealed ages of between 20000 and 30000 years. This suggests that most of the water in these aquifers was supplied during the wetter climatic phases of the Quaternary period. However, several studies have also clearly shown that a recharge of these aquifers is currently taking place at an estimated 15 per cent of the annual

rainfall which is approximately 100 millimetres (Beaumont, 1981; Pike, 1983).

During the 1970s, Saudi Arabia imported more than 50 per cent of its agricultural products (El-Khatib, 1980). The government was keenly aware of the need to lessen this dependence and encourage a high degree of self-sufficiency in certain agricultural products (Pike, 1983). Thus, from 1979 and during the early 1980s agricultural production in Saudi Arabia entered a period of unprecedented growth. This expansion in farming was facilitated by direct and indirect support from the government in the form of free land distribution, subsidies (especially for wheat) and interest-free loans (Ministry of Agriculture and Water, 1984).

These incentives have increased cultivated lands considerably, and wheat production in particular (Table I). In 1988, for instance, the cropped area in Saudi Arabia was about 12451076 donums (one hectare = ten donums). Wheat production in the country increased from 141732 tons in 1980 to 2134930 tons in 1985, and reached 3267391 tons in 1988 (Central Department of Statistics, 1983–1990). Wheat production exceeded the country's needs by the mid-1980s, and by 1988 wheat production recorded a surplus of 2.5 million tons (Ministry of Planning, 1990). Wheat surpluses have been exported to several Arab, Asian, African and European countries as well as the Soviet Union and China (Ministry of Agriculture and Water, 1989).