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JORDAN

NATURAL RESOURCES AUTHORITY STUDIES WATER USE

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[Article by Anne Counsell]

[Text] AMMAN - "The management of available water resources is a key issue in ensuring adequate supplies of water for domestic, industrial and agricultural use and to meet the needs of the country," according to Dr. Ahmad Keilani, director of the Water Resource Studies Directorate at the Natural Resources Authority (NRA).

Dr. Keilani said that demands for water are increasing due to the rising population, and the development of agriculture and industry, and that in order to meet these demands proper management of our limited supply is essential to avoid wastage and depletion.

In an interview with the Jordan Times, Dr. Keilani outlined the activities and current projects at the NRA to ensure the continued supply of water.

The departments within the Water Resources Directorate (WRD) cover all aspects of water resources. One of these is the Ground Water Studies Division which deals with exploration studies, mapping, drilling, data analysis and management to make sure that discharge does not exceed recharge which would otherwise lead to depletion.

The second division is concerned with surface water and it monitors the hydrological cycle in Jordan, recording the distribution, intensity and quantity of rainfall and also how this water is diverted into run-off, and gauges the base

flow of wadis, rivers, and springs quantitatively.

Another aspect is the qualitative analysis of water samples taken from various sources which are chemically tested in the water laboratory. In addition, the management department compiles the hydrolic data and, using parameters and models, makes predictions about the behaviour of water basins at different rates of production in order to meet demands for water.

The recent acquisition of a vast water data bank computer has enabled the calibration, compilation and analysis of data for use as an effective planning tool, said Dr. Keilani.

Dr. Keilani went on to say that the same model of computer has been used by the United States Geological Survey and that the NRA is benefitting by using some of their programmes. The data bank is part of a joint United States Agency for International Development (USAID) and Jordanian project called: "The ground water assistance project for North Jordan," he added.

Dr. Keilani said that priority was given to the assessment of ground water supplies in the northern part of Jordan extending to south Amman, because this area consumes 85 per cent of the total demand for water due to the high density of population in the Amman, Zarqa and Irbid regions. In addition, 80 per cent of the

country's water resources are concentrated in this area, he said, warranting a large scale project.

Dr. Keilani said that USAID are contributing \$5 million for equipment, advisors and training while the Jordanian contribution is \$4 million. The equipment includes large drilling rigs for deep aquifers as the more shallow areas have already been exploited.

Dr. Keilani mentioned other important projects, including the provision of water for the extraction of oil from shale where the requirement of water is estimated at 23 million cubic metres per year for the process. Wells are being drilled in the area to the east of Karak, where the shale is concentrated, as pilot studies for the scheme to determine the water resources and its distribution.

He also said that the possibility of building surface dams is also being studied, with a quantitative analysis to ensure a reliable source of water. These are still at the feasibility plans stage which includes the evaluation of resources, as water is a limiting factor in its implementation.

Another major project that Dr. Keilani mentioned was the artificial water recharge scheme, a pilot plan to save flood waters in the winter to use when required in the drier months of summer. The flood waters are discharged into the Dead Sea and the Jordan Valley in addition to being overspilled

from the King Talal Dam, resulting in wastage.

Dr. Keilani said that studies have been made for the construction of a rock dam to hold flood water, computed at between one point two and two million cubic metres per year, which is at present being lost in this area, being allowed to drain away. Dr. Keilani said that the pilot project aims to utilise the surface water behind the dam by injecting the water through special wells, returning it to the water table which would improve the quality of the available ground water in addition to compensating for mismanagement.

The over pumping of water led to depletion and a deterioration in quality in the Duhleil area where the pilot scheme is being tried out. Dr. Keilani continued, saying that the dam along Wadi Argeb was constructed in September 1983 as a way of trying to prevent the dissipation of water into bowls where it then evaporates and is wasted.

He said that observation wells have been drilled around the injection well to monitor the behaviour of the injected water and its effect on the water table to determine the rate of injection. One of the problems associated with the injection of flood water is the silt and sediment suspended in it, and, Dr. Keilani said, if this silted water was pumped into aquifers it could lead to blockages. This likelihood is being minimised by allowing the silt to settle behind the dam. In addition, he said, water will enter the dam from the bottom to minimise the problem and that a system of automatic pumps will prevent spillage by starting

automatically when the water reaches a certain level along with flow meters and two pumps that work in parallel or alone depending on the amount of water.

Dr. Keilani said that the injected water will move to other wells downstream which will benefit, and that the project should be implemented this season following the awarding of the contracts for the pumps. The pump specifications and designs will ensure the pumping of the water within 90 days to minimise evaporation, he said.

On top of these projects, there are several ongoing schemes including the National Water Resources Master Plan which is updated every year with data for planning, he said. This includes ground water studies all over Jordan with drilling programmes, meteorological studies and quantitative investigations.

Also, Dr. Keilani said, there are joint ventures with the Royal Scientific Society (RSS) to utilise wind power and solar energy for the pumping of water. He said that the applications are limited to selected wells because depth is a limiting factor.

The wind power project began in 1982 as a pilot project with the NRA supplying data on well selection, meteorological data and environmental information, he said. Dr. Keilani said that both the solar and wind powered wells could be used effectively in remote areas as little maintenance is required and that energy could be stored in batteries for a secure energy source. It is still a pilot project but could be extended, he said, following the collection of

long term data in different seasons.

Dr. Keilani said that the Water Resources Directorate will become a part of the water authority which will act as an umbrella to unify water supply on a national scale.

The new water authority was established by a royal decree and will commence operations on January 15 when the Amman Water and Sewerage Authority and the Water Supply Corporation will be grouped together, with the water department of the Jordan Valley Authority and the WRD of the NRA to be included at a later date.

Dr. Keilani said this will be an integrated system with the WRD supplying the data of available water resources for the projects. He also said that the projects of the WRD would still continue under the new water authority which will cover all aspects of planning, water supply, applications and construction connected with water with financing from water tariffs and the government.

Dr. Keilani also mentioned that a Higher Water Council would be established with representatives from ministries connected with water, such as the ministries of agriculture, environment, health and industry, as well as municipalities and that the supreme head of this council would be the prime minister.

Dr. Keilani concluded by saying that he felt this was a move to fully utilise one of Jordans most important limited resources and to avoid wastage through improved management of water.