

ASSESSMENT OF THE WATER RESOURCES IN THE ZINDER REGION (NER/8/007) F4

New

MODEL PROJECT

CORE FINANCING

YEAR	Experts		Group Activity	Equipment	Fellowships		Scientific Visits		Group Training	Sub-Contracts	Misc. Comp.	TOTAL
	m/d	US \$	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	US \$
1999	2/0	29,400	0	10,000	6/0	20,700	0/15	5,400	0	25,000	0	90,500
2000	2/0	30,900	0	10,000	3/0	10,800	0/0	0	0	25,000	0	76,700
2001	1/0	16,200	0	0	0/0	0	0/0	0	0	15,000	0	31,200

First Year Approved: 1999

OBJECTIVES: The project addresses the improvement of the quantity, quality, and sustainability of critical groundwater resources in the Zinder region. Specifically, the aims of the project are (i) to evaluate the origin, dynamics and groundwater resources using isotopic techniques ; (ii) to assess the proper exploitation of aquifers ; (iii) to establish the routine use of nuclear techniques by institutions responsible for water management policy at the local, regional and national levels.

BACKGROUND: The rapid population growth of the town of Zinder (roughly 174,000 inhabitants), Niger's biggest city after the capital Niamey, and of its surrounding region has led to a sharp increase in water demand. Since the 1960s, the Zinder region has been suffering from a severe ground and surface water shortage. Efforts to improve water availability using isotope hydrology in combination with hydrological methods is of particular priority for the Niger Government. Water resource management is also a component of the Government's National Environment Plan for Sustainable Development (PNEDD), which will define environmental policies, emphasis and strategies. However, the lack of complete hydrogeological information hinders proper management of groundwater. The main reservoirs (alluvial aquifers of Gogo and Machaya marshes), which are sensitive to climatic changes, cover only 40% of the demand despite being artificially recharged by floodwater during the rainy season. There has been no regular monitoring of groundwater systems. The limited information available indicates that aquifer conditions do not allow extensive exploitation, and pollution is also a problem at sites subject to overexploitation and lacking protective measures. A number of donors - including UNDP, the European Investment Fund, Canada, China, Denmark, France, Italy and Germany - recently assisted the Nigerien Government in seeking a sustainable solution to the water problem. Presently, China is supporting efforts to develop a long term management model of water resources in this region. Early hydrogeological studies indicate two areas where pumping stations could be installed, one located at Arangouza (25 km north to Zinder), and the second at Ganaram (45 km). A CPF mission (1997) recommended assessing the water resources of Zinder as a priority area where co-operation with this country should be concentrated. For this, the use of isotopes is indispensable, combined with other methodologies using fluid mechanics and geophysics. The Agency will assist the Nigerien authorities to assess, develop and manage these water resources, which will include identification of the origin and dynamics of groundwater, and evaluation of recharge and discharge of aquifers. This will be the first isotopic study undertaken in the region. The information will be used in estimating recharge rates and water budgets in order to develop guidelines for optimum water resource management. The Government's objectives are: (i) To develop groundwater resources for civil, agricultural, livestock and industrial purposes, (ii) to exploit shallow aquifers for small scale private irrigation,

(iii) to improve conservation of rainwater reserves and groundwater resources, and (iv) to develop engineering works along the wadis for sustainable water resource management and flood control.

PROJECT PLAN: In the two areas, field campaigns will collect basic hydrogeological, geochemical and isotopic data. Reports based on the field data and on analytical data from local and outside laboratories will recommend actions and support sound strategies for siting new wells. Additionally, a pollution assessment will lead to actions to mitigate the adverse effects of poor quantity and quality of drinking water. 1999: The counterpart will compile and review existing data from previous and ongoing hydrogeological studies conducted in the Zinder region. Chemical and isotopic analyses will be performed to obtain information on the main characteristics of the aquifers and on their correct exploitation. 2000: Sampling campaigns are foreseen. The analyses will be done partly in the national laboratory (Institut des Radioisotopes) and partly outside the country in laboratories chosen by the Agency. 2001: The information obtained after the conclusion of the field campaign will be processed to determine the potential of the aquifers to supply water for different uses. Based on all the results obtained from this project as well as from geological, hydrogeological, and geophysical studies carried out simultaneously, the potential of the aquifers will be assessed and, if positively evaluated, will eventually lead to a more comprehensive well drilling programme.

NATIONAL COMMITMENT: Qualified staff from all participating institutions will be available for the project. The Ministry of Hydraulics and Environment will conduct the project in co-operation with the University and other local water supply institutions (SNE, OFEDES) to investigate groundwater resources. Analytical services will be provided by the Institut des Radioisotopes, which is already involved in several studies and projects through previous Agency assistance. The laboratory has experience in using isotope and chemical techniques and is well equipped for chemical and carbon-14 analyses, but needs some complementary supplies. The counterparts (the Ministry of Hydraulics and the Geological Institute of the University) have been directly involved in previous Agency technical assistance projects.

AGENCY INPUT: Expert services for the interpretation of hydrochemical and isotopic data, for the elaboration of progress reports including suggestions for additional locations for new drilling, and for the development of a long term water resource management model; equipment, consumables and supplies for field, laboratory and specific analytical services; training through fellowships and scientific visits.

PROJECT IMPACT: The immediate end users of the project output are the Directorate of Hydraulics, SNE, OFEDES and the Directorate of Water Resources in Zinder. The evaluation of water resources and their hydrogeological behaviour, the assessment of the water quality and the development of a water management model by means of nuclear techniques will yield information that will enable the identification of areas for drilling additional wells and for developing rural activities. Moreover, all this information will provide details on the resources and mechanisms of aquifer recharge, the timeframe for the renewal of groundwater, and the vulnerability of the hydraulic systems to pollution. Local authorities dealing with water management will be able to make decisions on rational exploitation of groundwater resources. This will bring about an increase and an improvement of water supply for human consumption and irrigation uses.