ISOTOPE TECHNIQUES FOR WATER RESOURCE MANAGEMENT (ETH/8/006) 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	5.0	88,200	0	95,000	9/0	31,050	0/15	5,400	0	35,000	0	254,650
2000	4.0	61,800	0	75,000	9/0	32,400	0/21	7,980	0	45,000	0	222,180
2001	2.0	32,400	0	25,000	0/0	0	0/0	0	0	45,000	0	102,400

FOOTNOTE a/ 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	1.0	15,450	0	80,000	0/0	0	0/0	0	0	0	0	95,450
2000	1/14	23,760	0	85,000	0/0	0	0/0	0	0	0	0	108,760
2001	2/0	33,900	0	10,000	0/0	0	0/0	0	0	0	0	43,900

First Year Approved: 1999

OBJECTIVES: To make an assessment of the groundwater potential in order to plan its judicious exploitation, to elucidate the mechanisms causing the rise in the levels of two lakes with a view to taking remedial measures, and to assist in the exploitation of geothermal fields.

BACKGROUND: The project aims to assist the Government of Ethiopia in the sustainable development of water resources and environmental management. Environmentally friendly tracer techniques, which are known to be economically viable and technically sound, will be used to address groundwater exploitation, the development of geothermal resources, and unexplained mechanisms causing the expansion of certain lakes. The surface water reserve in Ethiopia is estimated to be 110 billion m^3 and the groundwater reserve 2.5 billion m^3. The latter figure appears to be unrealistically low. The semi-arid and arid lowland of southern Ethiopia has been subjected to repeated drought during the past several years and surface water is totally insufficient to meet the demand. Since groundwater is virtually the only choice in these areas, it is important to make an accurate assessment of groundwater resources in terms of quality and quantity on a national scale. The implementation of an Agency supported project in the Moyale region, southern Ethiopia, has already demonstrated that isotope hydrology techniques can play a unique role to quantify aquifer recharge, identify hydraulic interconnection between shallow and deep aquifers, and assess the sources and extent of pollution in the shallow aquifers. The ongoing project covers an area with three million inhabitants, who are expected to benefit from a judicious exploitation of the groundwater resources. Under the present programme, it is intended to develop a long term strategy for groundwater resource assessment on a national scale. This strategy is to be implemented with short term projects executed sequentially. Initially, they are likely to include the assessment of recharge rates and dynamics in the aquifers for Addis Ababa and Mekele. Lake Beseka, which is located in the central part of the Ethiopian Rift valley, has risen significantly and expanded from its original 3.3 km^2 in 1984 to over 35 km^2 in 1990. A highway and a railway are under serious and recurrent threat of being flooded and a significant portion of the Metehara sugar cane plantation has been inundated. Several attempts to identify the cause of this problem have not produced any concrete results with conventional methods. Preliminary tests, which have been carried out recently at the request of the Government, indicate that isotope hydrology techniques can be used to elucidate the mechanisms causing the expansion of the lake, thus paving the way to remedial action to mitigate the threat of floods in the region. Lake Awasa, in the southern Rift valley, has also registered a rise in water level of two meters in the past two years, and is threatening to flood the fast growing regional capital, Awasa City. Isotopic techniques are to be used to investigate the hydrology of Lake Awasa. At present, Ethiopia gets about 20% of its total installed electric power of 450 MW from imported fossil fuels. Moreover, hydroelectric power generation is unreliable because of seasonal droughts. In fact, most of the country is not electrified and more than 90% of the population rely on wood for their energy requirements, thus causing ecological damage through deforestation. On the other hand, Ethiopia has considerable geothermal resources in the Rift valley which could be exploited for electricity generation. A 7.5 MW(e) geothermal pilot power plant is presently under construction and is expected to become operational by the end of 1998. Isotope techniques are already being used, with the assistance of the Agency, to study various parameters associated with the exploitation of the geothermal resources, including recharge, water-rock interaction and age of the geothermal water. It is necessary to extend the project area to make a thorough assessment of the potential of geothermal resources in the Rift valley for the generation of electricity. Rural electrification by this means is expected to benefit up to five million people.