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Multiple use benefits

Keban, Turkey

The Keban Dam was built to provide hydro electricity to Turkey. However, increased agricultural productivity, a new commercial fishery and the ability to survive drought periods also resulted from the operation of the dam.

Overview

The Electricity Survey Administration (EIE Idaresi), first investigated the potential of the Keban Dam in 1936, in an effort to develop hydropower capability in Turkey. However, it was the establishment of the State Hydraulic Works (DSI) in 1954 that ultimately resulted in the design and construction of the Keban Dam and Hydroelectric Power Plant. Power generation commenced in 1975.

Located at 45 km north west of Elazığ, water enters the Keban Dam through the Karasu and Murat Rivers, tributaries of the Euphrates. Geological formations at the site have resulted in a deep valley, hence the dam has a small surface area relative to depth and suffers lower evaporative losses than other dams of similar capacity.

Structurally, Keban Dam comprises a rockfill main dam of 601m length and a 524m long concrete gravity structure (including the spillway and intake), giving a total crest length of 1,125m. The spillway has 6 radial gates for a discharge capacity of 17,000 cumecs. Water discharged through the spillway is channeled downstream through a 124 m wide and 400 m long chute terminating with a flip bucket

The power plant is equipped with 8 units, the first four of 157.5 MW each and the more recently installed four units of 175 MW capacity. Power generation commenced in 1975 and the plant has produced almost 176.4 billion kWh.

Dam Name

Scheme operator
State Hydraulic Works

Size of scheme (MW)
1330

Country Turkey	Catchment area 64,100km ²
River Euphrates	Effective reservoir capacity 30.6 x 10 ⁹ m ³
Construction years 1965-75	Reservoir size 675km ²
External recognition Nil	

Details

Although the Keban Dam was constructed primarily for the purpose of generating hydroelectricity, a number of additional benefits have resulted:

- Commercial Fishing
The creation of a new commercial fishery in the Keban Reservoir benefits low income, unskilled workers through direct employment of approximately 900 people, and indirect employment for others in support industries (eg transport ferries, fish hatcheries). As a result of fish stocking programs, Keban yields approximately 4000 tons of fish annually, with a market value of \$6 million US.
- Irrigated agriculture and drought management
Prior to the construction of the Keban Dam, agriculture in the region had been devastated by droughts during the period 1958-62 and 1970-75. By contrast, irrigation releases from Keban Dam in 1989 protected Turkish, Iraqi and Syrian farmers from severe dry conditions in that season. Under more typical rainfall conditions, the Eyüpbağları irrigation scheme has recorded increases in the production of cereals (190%), melon (250%), cotton (204%) and sugar beet (56%). Gross National Agricultural Product has undergone an increase of 3,535 USD per ha irrigated.
- Employment opportunities
It is estimated that irrigated agriculture has created approximately 20 thousand new jobs in Turkey, whilst the commercial fishing industry has created a further 900 employment opportunities.

Other Aspects

Distribution and Sharing of Benefits

The construction of the Keban Dam has benefited underprivileged communities in Turkey, Syria and Iraq through the ability to manage droughts and the creation of thousands of employment opportunities, as well as the availability of electricity.

Cost benefit and economic performance

Since commissioning, the Keban Hydroelectric Power Plant has produced 6,000 GWh

of electricity per year, effectively recovering its construction cost 7 times over. In addition, it has created new irrigable area of 55,755 ha, a productive new commercial fishery and tens of thousands of new jobs.

Resource use

The Euphrates River is highly variable in its flow characteristics. The ability to store water enables dam operators to provide water for irrigation during drought periods.

Further Information

Further Information

Source: Hydropower Good Practices Workshop, Annex VIII - Examples for Good Practice Report, Villach, Austria, October 2005. International Energy Agency.

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