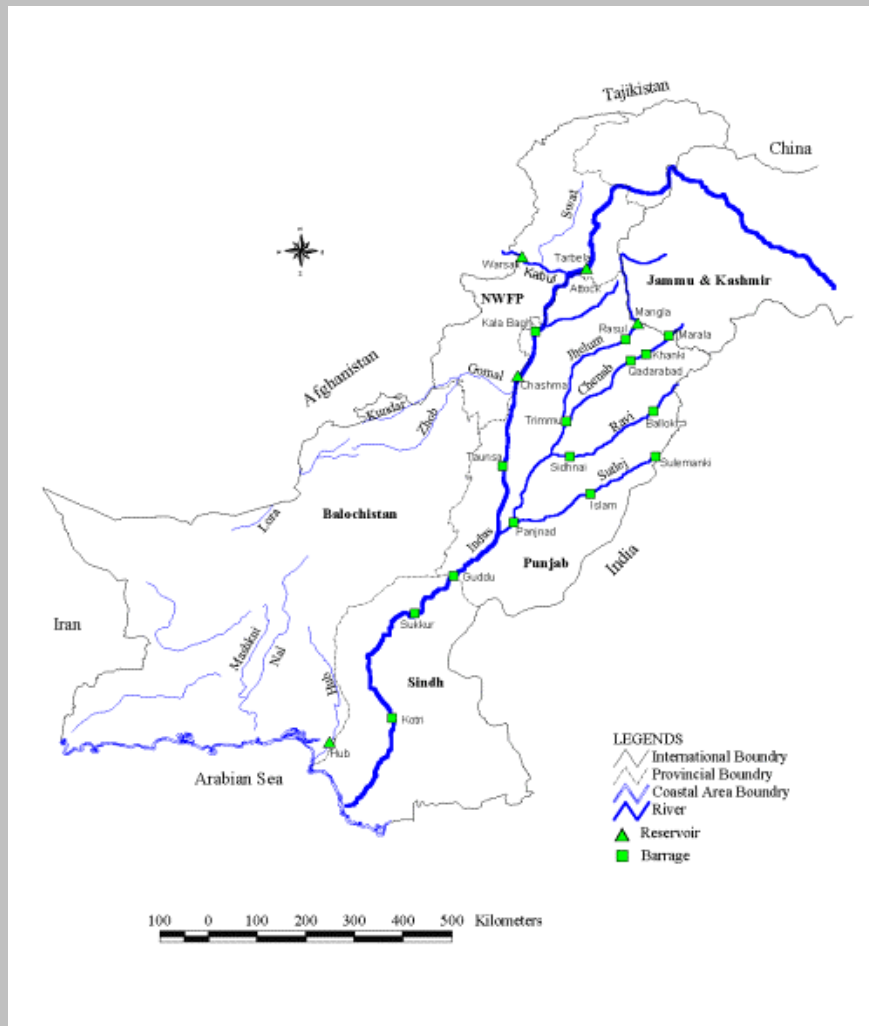


MAJOR BARRAGES OF PAKISTAN

KEY FACTS

Barrage	Year of Completion	Max. Design Discharge (cusecs)	No. of Bays	Max. Flood level from floor (ft)	Total Design Withdrawals for Canal (cusecs)
Chashma	1971	1,100,000	52	37	26,700
Guddu	1962	1,200,000	64	26	-
Jinnah	1946	950,000	42	28	7,500
Kotri	1955	875,000	44	43.1	-
Sukkur	1932	1,500,000	54	30	47,530
Taunsa	1959	750,000	53	26	36,501



1.0 HISTORY OF CONSTRUCTION OF BARRAGES

Pakistan takes pride in its achievements in the construction of several barrages. Historically, Pakistan has been designing and constructing weirs and barrages, which has led to the state-of-the-art present-day knowledge.

Even before the creation of the country, the areas now included in Pakistan were under-going developments to build some gigantic and remarkable engineering works. In 1871, the weir across River Ravi was built at the head of Bari Doab canal in Punjab. The building of Khanki headworks was undertaken in 1890-92. The headworks of Rasul on Jhelum River were built in 1901. Between the period 1900-1950 the following were constructed: Marala weir on River Chenab, Balloki headworks on River Ravi and Ferozpur, Sulemanki, Islam and

The maximum discharges of the canals constructed before the Indus Basin Treaty was 10,000 cusecs while those during the later period were of the order of 20,000 cusecs.

Panjnad on River Sutlej, Trimmu on River Jhelum and Sukkur and Kalabagh on River Indus.

Between 1950-52, three barrages were constructed on the Indus River at Kotri, Taunsa and Guddu. Later, as part of the Indus Water Treaty, the following barrages were constructed between 1962-75: Sidhanai on Ravi, Rasul on Jhelum, Qadirabad and Marala on Chenab and Chashma on Indus.

2.0 CHASHMA BARRAGE

Chashma Barrage was constructed in 1971 on the River Indus near the village of Chashma, about 35 miles downstream of Jinnah Barrage. It was constructed to divert the water released from Tarbela into River Jhelum through the Chashma-Jhelum Link Canal, which has a capacity of 21,700 cusecs. The barrage was also designed to feed the Paharpur canal that is located on the right side.

The river valley at Chashma is 6.5 miles wide. The barrage is 3,536 feet long with 3,120 feet of clear waterway and with a maximum design discharge of 1.1 million cusecs. The total designed withdrawal for canals is 26,700 cusecs. The maximum flood level height of Chashma Barrage is 37 feet. The barrage has 52 bays, each 60 feet wide. The length of the left and right guide bank is 4,302 ft.

The Chashma Right Bank Canal, a lift-cum-gravity canal, is being executed at a cost of US\$ 633 million. The canal is 71 miles long, with 37 miles of feeder canals and a capacity of 2,500 cusecs. it would benefit an area of 261,000 acres.

Low-head hydropower generation is being tapped from several barrages in Pakistan. A similar project of Rs 17.822 billion is under execution at Chashma, which is expected to complete this year. The government has allocated Rs. 986 million for this project for the year 2001-02.

3.0 GUDDU BARRAGE

Guddu Barrage was constructed in 1962 on River Indus with a maximum design discharge of 1.2 million cusecs. It is a gate-controlled weir type barrage with a navigation lock. The barrage has 64 bays, each 60 feet wide. The maximum

flood level height of Guddu barrage is 26 feet. It controls irrigation supplies to 2.9 million acres of agricultural lands in the Jacobabad, Larkana and Sukkur districts of Sindh and the Nasirabad district of Balochistan. The cost of the project was 474.8 million rupees. It feeds Ghotki Feeder, Begari Feeder, Desert and Pat Feeder canals.

Guddu has low-head hydropower potential. A Draft Feasibility of 33.5 MW was conducted with the technical assistance of GTZ. The purpose of the project is to utilize existing canals and structures for bed stabilization and water diversion, which results in enormous savings for the generation of hydel energy.

The powerhouse will be equipped with 5 pit type Kaplan turbines in horizontal setting. Hydraulic Modeling Studies are presently in progress at the Nandipur Irrigation Research Institute.

4.0 JINNAH BARRAGE

Jinnah Barrage was constructed in 1946 on River Indus with a maximum design discharge of 950,000 cusecs. The total designed withdrawal for canals is 7,500 cusecs. The maximum flood level height of Jinnah Barrage is 28 feet. The barrage has 42 bays, each 60 ft. wide. The length of the left bank is 4,099 ft and that of the right bank is 5,487 ft.

A low-head hydro power generation project is also planned at Jinnah Barrage costing Rs. 9,882 million which will be spent in 6 years of project duration. A feasibility study conducted with the assistance of ODA indicated the potential for 144 MW project through 16 pit type turbo-generators. WAPDA now envisages 96 MW of installed capacity. 8 units with a gross head of 16 feet will generate power.

5.0 KOTRI BARRAGE

Kotri Barrage was constructed in 1955 on River Indus with a maximum design discharge of 875,000 cusecs. The barrage has 44 bays, each 60 feet wide. The length of the left and right guide bank is 6,000 ft. The maximum flood level height of Kotri barrage is 43.1 feet.

Kotri Barrage was constructed to irrigate Fulleli, Pinyari and Kolari canals through lined channels and enhance agriculture in the lower Sindh region.

The need to release some amount of water below Kotri Barrage, which is the last diversion point on the Indus River System, has been recognized by most experts. The purpose is to provide the *sailaba* (flood) Irrigation in an area of approximately 120, 000 hectares and keep the 280-kilometer Indus River Reach from the Kotri Barrage to the Arabian Sea, alive. Furthermore, any amount of water released below Kotri would help in checking seawater intrusion.

6.0 SUKKUR BARRAGE

Sukkur Barrage was constructed in 1932 on River Indus. It is among the few large barrages in the world, and has a maximum design discharge of 1.5 million cusecs.

The total designed withdrawal for canals is 47,530 cusecs. The barrage has 54 bays, each 60 feet wide. The maximum flood level height of Sukkur barrage is 30 feet.

7.0 TAUNSA BARRAGE

Taunsa Barrage was constructed in 1959 on River Indus, 18- miles downstream of Chashma Barrage in district Muzaffargarh. The barrage has a maximum design discharge of 750,000 cusecs. The total designed withdrawal for canals is 36,501 cusecs. The maximum flood level height of Taunsa Barrage is 26 feet. The barrage has 53 bays, each 60 feet wide. The Taunsa-Panjnad Link has been made to supply water to the Panjnad Headworks. It also feeds the DG Khan and Muzaffargarh canals.

The length of the left and right guide bank is 8,327 ft. The gates, 60 x 22.5 feet in size, are manually operated.

The feasibility for low-head hydel power has been completed through a CIDA grant, and 120 MW power station will be installed with 8 pit type turbo-generators.

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