Brief Report on Kotha Barrage Project Vidisha

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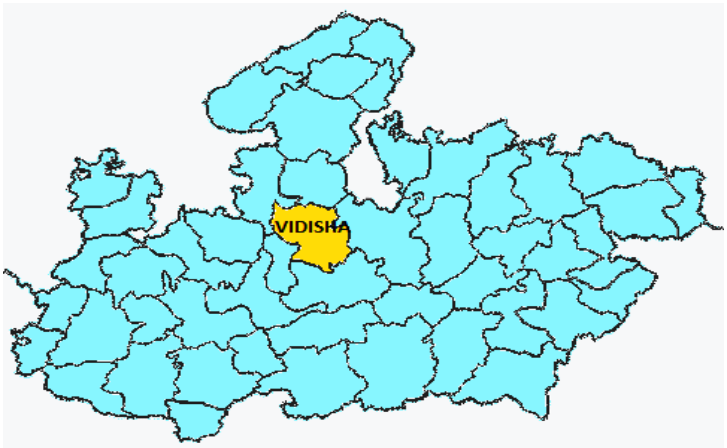
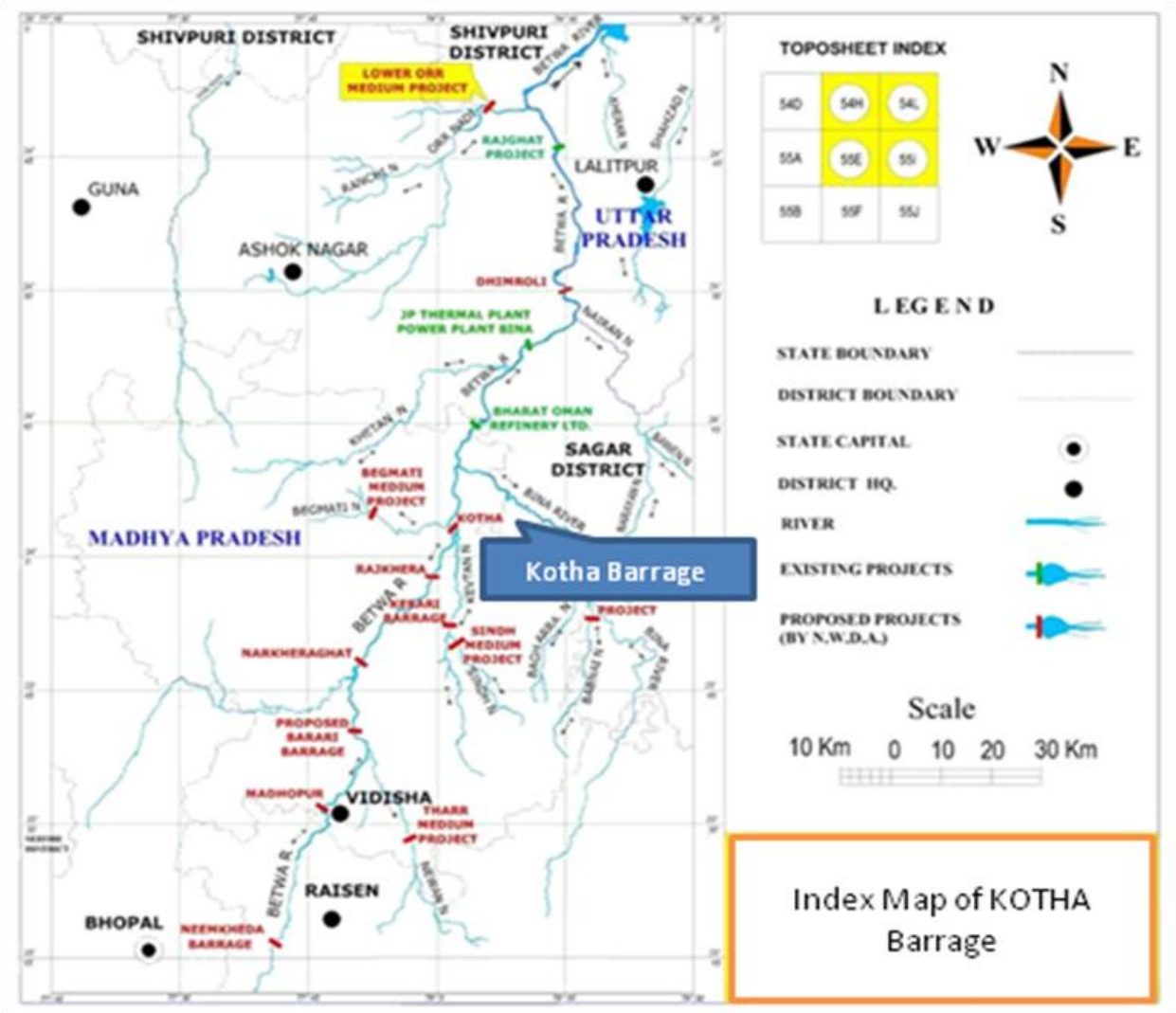




Introduction

The Betwa basin is one among the six major river basins of Madhya Pradesh. The river Betwa which is also called river Vetrawati in Sanskrit and is an interstate river flowing between MP and UP. The river basin is a part of Yamuna basin which ultimately forms part of Ganga basin. The river flows about 216 km in MP , makes common boundary there afterwards in 98 kms and then it runs for about 261 kms in UP before finally joining river Yamuna. The river Betwa covers areas of Sehore, Bhopal, Raisen, Vidisha, Guna, Shivipuri and Datia district of MP. Out of these for the districts of Bhopal, Raisen and Vidisha the river by all means acts as a main lifeline for all the activities related to irrigation, domestic water supply, industrial water needs, nistar and other minor activities.

The Betwa sub-basin for the purpose of use and in accordance with the interstate agreement with UP is divided in three subparts namely upper, middle and lower Betwa sub-basins. The river Betwa has 14 principal tributaries and out of which 11 lies completely in M.P. whereas, 3 lies partly in both of the states. Fast industrial development , outbreak of population due to formation of capital and setting up of industrial hub in Mandideep and other places and promotion of high intensity, high yielding crops, in the agricultural sector has resulted in multifold increase in water demand as compared to other part of the basin and in comparison of other river basins.

This growing need of water has to be satisfied within the constraints of limited surface water and ground water availability in the upper Betwa basin. So for construction of one major project and four medium project (seven medium projects on u/s of rajghat dam) along with about 100 odd minor irrigation schemes were completed, thereby providing about 800-900 Mcum of water. However, there is a further increased demand from irrigation and water supply particularly in the middle part of upper Betwa basin. The most water short area in this context is in between Gulab ganj to Kurwai of M.P. Efforts were made for creation of storage reservoir at various identified locations such as Richhan Dam , Neemkheda Barrage , Barri Barrage , Darriya Dam and at other locations also, but construction of this structures were not found techno-economic feasible due to submergence of large areas of good agricultural land, number of villages and habitations and rail road infrastructures etc. Thus Proposals of number of dams and barrages are to be dropped on account of this problems in past on this account,. Furthermore the middle and lower part of upper Betwa basin do not offer good sites for construction of large dam and reservoirs.

It is in this situation the concept of creation of river bank confined storage schemes were analyzed. This would unable to store sufficient quantity of water for various growing demand in the areas of Vidisha distt. Which falls in middle of upper betwa basin without

submerging much of the costly private land, forest land submergence of habitation and infrastructures. as compared to conventional storage reservoir.

Considering this facts in to consideration it is proposed to construct a high barrage on the junction of river betwa and Keoten just U/S of confluence of river Bina with Betwa. About 85 Mcum of is proposed to be stored within the banks of river Betwa and Keoten by constructing a Barrage of about 13.5mt. height. The command on left and right bank to a magnitude of 20,000 and 12,000 Ha would be provided irrigation by lifting water an5 than providing micro irrigation down to 1 Ha Through a pressurized irrigation system and by way of sprinkler irrigation system. The project will further utilize the consumptive use of regenerated water from the u/s irrigation projects to a tune of about 20 Mcum by arresting the post monsoon flow of river Betwa and Keotan and regenerated water at a rate of 10% from the irrigation being done by already built up reservoir of about 900MCUM on u/s of proposed Kotha barrage.

The proposed scheme will not involve submergence of any forest area, any wild life or any villages or habitation. The submergence created on the back of barrage will require about 681 Ha of private land and about 678 Ha of Govt. land only. The main benefits from the proposed project can be summarized as below:

(1) Assured Irrigation to 32000 Ha. Of land on left and right flank of Betwa river through lifting of water by micro irrigation system.
(2) Direct irrigation to 3000Ha Of land by private lifting by formers on both the banks of river Betwa and river Keoten.
(3) Providing 5.0 Mcum of water for the proposed new industrial activities in the sub basin area.
(4) Providing 2.5 Mcum of water for the proposed new Domestic water supply in the sub basin area.
(5) Providing 2.5 Mcum of water for maintaining environmental flow in lean 4 months in river Betwa.

Basic Features

- The proposed barrage site is located on Betwa river near the village Kotha in the tehsil of Basoda of Vidisha district of Madhya Pradesh.
- The total catchment area upto Kotha barrage site is 8711 sq km.
- The yield upto the proposed site as per the master plan of 1972, 2004 and as agreed upon in the interstate agreement works out 1794.36 Mcum for a catchment area of 8694 sq km. Thus giving a yield factor 0.206 Mcum/sq km. The expected yield (virgin) at the site at 75% dependability on the basis of current datas has been again worked out to **1593.99** Mcum. This gives a yield factor of 0.183 Mcum/sq km. To avoid any further

interstate dispute with UP, the yield factor as mutually agreed by both of these two states as 0.20 Mcum /sq km has been finally retained for the purpose of water planning, irrigation planning and water balance studies.

- The pond level (FRL) of the barrage is proposed to be kept as **395.00** m to restrict the submergence area to **1359** Ha only and to allow passing of design flood without any considerable afflux. The total storage capacity at pond level works out to 83.6 Mcum excluding recharge of about 20 Mcum (considered @ 05% of total u/s use). The project will provide irrigation for culturable command area of 35000 Ha located in Vidisha, Ashoknagar and Sagar districts.
- **Location:**

Headwork	Longitude	Latitude	Topo Sheet
Kotha	78^0 01' 16" E	24^0 3' 28" N	54L/4

- **Access:**

From / To	Airport	Rail head	Road head	River head	Sea port
Kotha Barrage	Bhopal	Mandi Bamora	Kurwai	Nil	Nil
Distance(KM)	115	5	8		

- **Area under basin:**

Percent areas of districts lying in basin u/s of Kotha Barrage

Sno	District	Total Physical Area of District (Sq Km)	Area lies in Betwa Basin (Sq Km)	%
1	Bhopal	2772	2219.8	80.08
2	Sehore	6578	175.0	2.66
3	Raisen	8446	3172.7	37.56
4	Vidisha	7321	3204.0	43.76
	Total	25117	8771.5	34.92

- **Proposed project: Main Parameters**

River	Tributory	Bed Level (m)	FRL (m)	Catchment Area (Km^2)	Total Storage (MCM)	Recharge from U/s Projects (MCM)	Total Utilisation (MCM)	Submergence Area (Ha)	Command Area (Ha)	District Benefitted
Betwa	Keoan	383.52	395.00	8711	83.6	20	103.6	1359	35000	Vidisha, Sagar & Ashoknagar

- **Hydrology**

SNo	Details of River Level	Level m	Submerged Area Ha	Live Capacity MCM	Type of Land Govt/Pvt	Remark
1	Bed Level	383.52	-	-	Govt	Lowest Bed level of river
2		384.00	58	0.02	Govt	
3	Flank Level	391.00	678	39.34	Govt	Water at level 391 m will be within flanks of river betwa & its tributories. Assuming land upto flank level will be Govrnment land.
4		392.00	783	42.00	678/105	Land Acquisition of 105 Ha above river flanke level
5		393.00	885	50.00	678/207	Land Acquisition of 207 Ha above river flanke level
6		394.00	1070	65.30	678/392	Land Acquisition of 392 Ha above river flanke level
7	FRL	**395.00**	**1359**	**83.60**	**678/681**	Land Acquisition of 681 Ha above river flanke level. 56.01 MCM is Recharge from projects upstream of Kotha Barrage
8		396.00	1861	107.72	678/1183	Land Acquisition of 1183 Ha above river flanke level
9	TBL	400.00		244.96		

- **Head works:**

SNo	Particulars	Proposed FRL 395.00 m	Reamrks
1	Location	River Betwa (M.P.)	Size of Gate (height) is reduced by 1 m (Level 395.00 m) and all civil works are constructed as per Level 396.00 m so that vertical gate height may be increased by 1 m as per future requirements
2	Flood Discharge (Cumec)	15204	
3	Length of Barrage (m)	576	
4	Number of Openings	32	
5	Clear Span (m)	15	
6	HFL (m) Local enquiry	394.33	
7	Gate Size	15 X 9.50	
8	Creast Level (m)	384.50	
9	Thichness of Piers (m)	3	

- **Canal:**

SNo	Particulars	Proposed FRL 395.00 m by MP				Reamrks
		Left Bank	Right	Upstream	Total	
1	Length of telescopic pressurised pipe Network (Km)	15.5	8.5		24	1. Left bank telescopic pressurised pipe Network taken upto river Khetan and whole command served by laying pipe at level 418.00 m
2	Capacity of Canal (Cumec)	6.6	3			
3	Average CCA Level (m)	418	410			
4	Diameter of Rising Main (m)	2.2	1.5			2. Right bank telescopic pressurised pipe Network taken upto river Bina. Command after confluence of Bina to Betwa is already included in Bina
5	Design Head (m)	78.69	60.56			
6	GCA (Ha)	24000	15000			
7	CCA (Ha)	20000	12000	3000	35000	3. Right bank command upto river Bina which is unirrigated by Bina complex project will be fully served by putting pipe network at level 410.00 m
8	Annual Utilisationfor irrigation (MCM)				103.5	
9	Beneficiary Districts	Vidisha, Ashoknagar	Vidisha, Sagar			

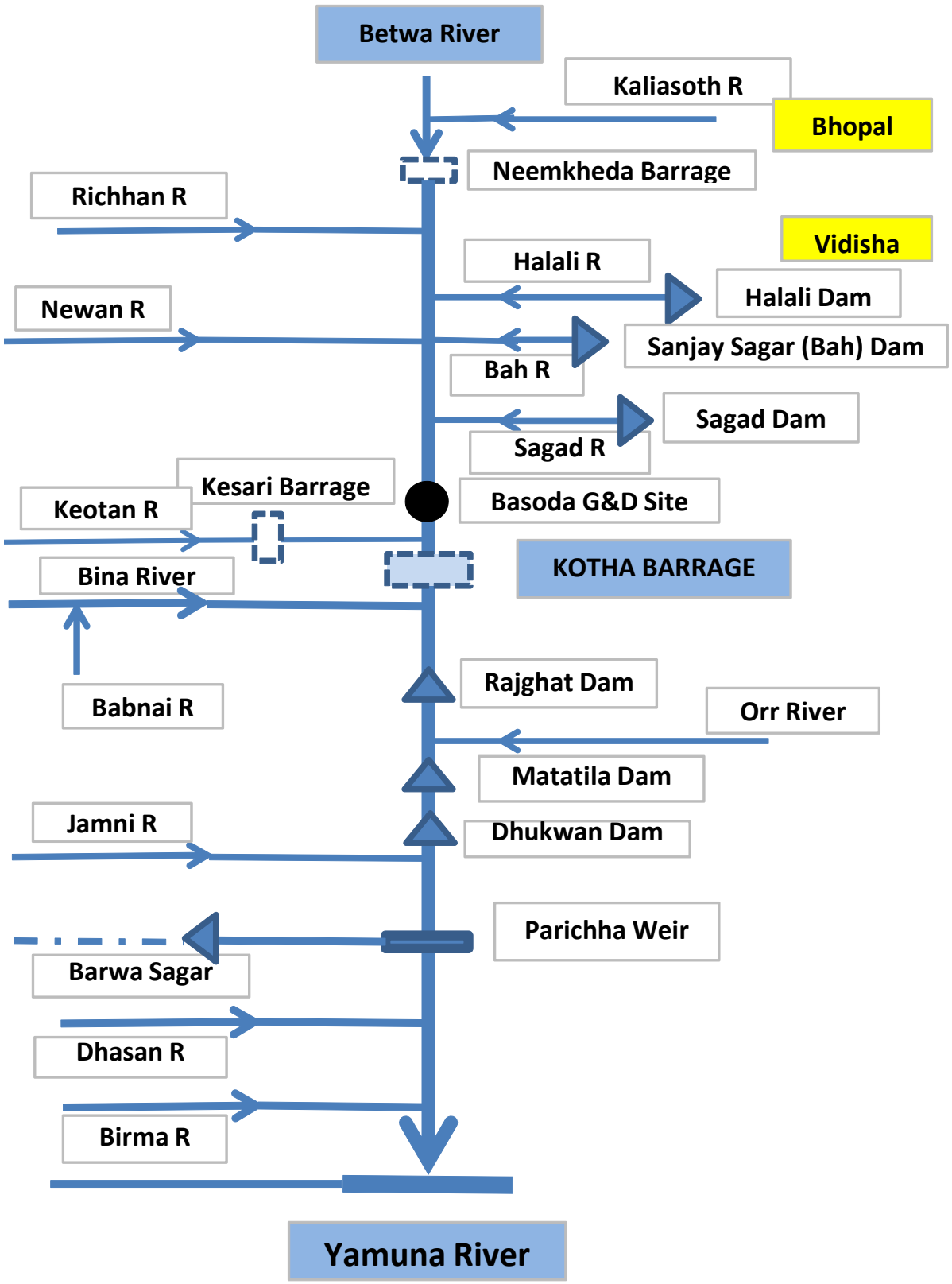
Cost:

General Abstract of Kotha Barrage

Rs in Crores

S. No.	Subhead	Unit-I	Unit-II	Unit-III	Total
1	A-Preliminary	1.06	0.87	0.00	1.93
2	B- Land	229.40	2.56	0.00	231.96
3	C-Works	211.73	0.00	0.00	211.73
4	D-Regulator	0.00	0.55	0.00	0.55
5	E-Fall	0.00	0.00	0.00	0.00
6	F-CD Works	0.00	1.00	0.00	1.00
7	G-Bridges	7.00	1.30	0.00	8.30
8	K-Building	0.20	0.20	0.00	0.40
9	L-Earth Work	0.00	131.36	0.00	131.36
10	M-Plantation	0.50	0.00	0.00	0.50
11	O-Misc.	1.00	*2.50*	0.00	3.50
12	P-Maintenance	1.06	2.10	0.00	3.16
13	Q- Special T & P	0.00	0.00	0.00	0.00
14	R-Communication	1.00	0.50	0.00	1.50
15	S-Power Plant (Solar Power)	0.00	0.00	*60.00*	60.00
16	T-Water Supply	0.00	0.00	0.00	0.00
17	U- Distributaries	0.00	288.00	0.00	288.00
19	'X'-Environment	0.25	0.25	0.00	0.50
	Grand Total	**453.20**	**431.19**	**60.00**	**944.38**
	Add establishment @ 3%	6.40	8.66	0.00	15.06
	Total Cost				**959.45**

Cost outlay details	Total Cost (Rs Crores)	Cost per Hectare (Rs Lakhs)
including solar power & prepaid metering system **considering** total benefited area of 35000 ha	959.45	2.74
including *solar power & prepaid metering system* ***excluding*** *direct private pumping of 3000 ha*	*959.45*	2.998
excluding solar power & prepaid metering system **considering** total benefited area of 35000 ha	896.95	2.56
excluding solar power & prepaid metering system **excluding** direct private pumping of 3000 ha	896.95	2.80


Betwa River
Kaliasoth R
Bhopal
Neemkheda Barrage
Richhan R
Vidisha
Halali R
Halali Dam
Newan R
Sanjay Sagar (Bah) Dam
Bah R
Sagad Dam
Sagad R
Kesari Barrage
Basoda G&D Site
Keotan R
KOTHA BARRAGE
Bina River
Babnai R
Rajghat Dam
Orr River
Matatila Dam
Jamni R
Dhukwan Dam
Parichha Weir
Barwa Sagar
Dhasan R
Birma R
Yamuna River