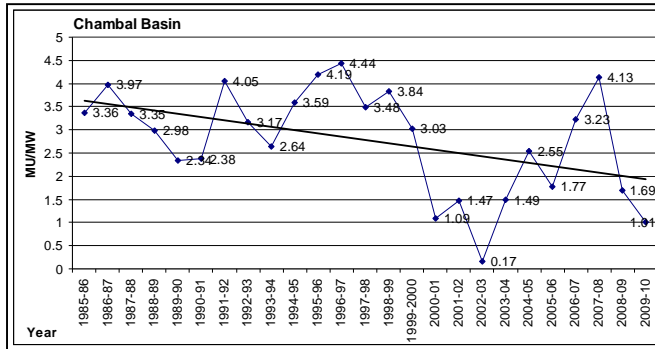


Why Gandhi Sagar is an Oxymoron

The strong case for reducing the FRL of the Chambal Dam

There is no doubt a very strong case for reducing the Full Reservoir Level of the Gandhi Sagar dam from 1312 feet to 1295 feet as it is likely to make available about 40000 ha of land that is otherwise not available. The reduction in the effective reservoir level won't reduce the current benefits of the dam.

This was one of the main resolutions passed by the convention organized by the Gandhi Sagar Vishthapit Sangh at Rampur in Neemach district in Madhya Pradesh during Nov 18-19, 2010. The convention was organized on the occasion of the 50 years of the Gandhi Sagar dam. On Nov 19, 1960, when Nehru commissioned three of the five 23 MW units of the then second largest reservoir of India, the project was named as Gandhi Sagar. The dam site holds the statues of Gandhiji to identify the Gandhi in the name of the dam, though the date Nov 19 also happens to be birth day of Mrs Indira Gandhi.



affected people, districts and the region and hence the name Gandhi should be removed from the name of the dam. In a resolution passed on Nov 19 at the public meeting, they said the dam may be called anything else (Hitlersagar was suggested by way of loud thinking) but Gandhi.

Indeed Gandhi Sagar is an over sized dam. It has a submergence area of 72300 ha according to the publication on Large Dams in India from Central Board of Irrigation and Power. But such a huge reservoir with catchment of 22533 sq km predictably filled to capacity only in five years in five decades.

Gandhi Sagar is part of the Chambal basin projects that includes Ranapratap Sagar, Jawahar Sagar and Kota Barrage in that order as we travel downstream from Gandhi Sagar (see map of the Chambal Valley on the next pages). The combined hydropower capacity of the three projects (Kota barrage is basically for diverting water into the right bank and left bank canals, it does not have hydropower component) is 386 MW. The hydropower generation from the three projects has been steadily and steeply declining as seen from the above graph showing the Million Units generated per MW installed capacity for the complex of three projects for the last 25 years from 1985-86.

The affected people were also pretty angry that the promises made when the project was proposed and their lands taken away are yet to be fulfilled. And the affected people are much worse off than they were before displacement. In fact, the stark injustice meted out to them is evident from just one figure. The compensation that they were given for the lands taken for the project was around Rs 100 per acre.

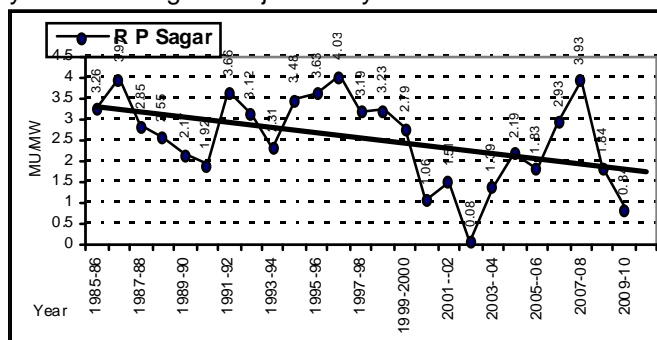
SALIENT FEATURES

Name of Dam	Gandhi Sagar	Ranapratap Sagar	Jawahar Sagar	Kota Barrage
Year of completion	1960	1970	1973	1960
Nearest city	Mandsaur	Kota	Kota	Kota
State	Madhya Pradesh	Rajasthan	Rajasthan	Rajasthan
Type of Dam	Masonry	Masonry	Masonry	Earthen
Height above lowest foundation level	62.17 m	53.8 m	36 m	51.9 m
Length of dam	514 m	1143 m	393 m	551.68 m
Gross storage capacity	7322.75 mcm	2898.69 mcm	52 mcm	112 mcm
Effective storage	6797.485 mcm	1566.52 mcm	13.2 mcm	83.2 mcm
Reservoir area	723 sq km	198.29 sq km	10.705 sq km	4.84 sq km
Catchment area	22533 sq km	24576 sq km	26880 sq km	
Purpose of the dam	Storage, hydropower	Storage, hydropower	Hydropower	Irrigation
Installed Capacity	115 MW	172 MW	99 MW	-
Full Reservoir Level, m	399.9	352.9	298.78	-
Minimum Draw Down Level, m	381	343	295.78	-
Design head, m	45.5	49.7	35	-
Tail Water Level, m Max/Min	353.27/343.51	Not Available	NA	-
Max discharge through turbines (total)	311.5 m ³ /s	396 m ³ /s	368 m ³ /s	-
Water speed m/s	3.6	NA	3	-
Designed spillway capacity	21238 cumec	18408 cumec	21240 cumec	21225 cumec

Source: National Register of Large Dams. 2002 and 2009 edition, Central Water Commission, Central Bureau of Irrigation and Power

Today when the displaced people have to apply for temporary cultivation rights for just one year for the same land that once belonged to them, they have to pay Rs 500 to 1000 per year and that too after going through the bureaucratic harassment including applying for such rights and bribing the irrigation officials in many cases every year.

The affected area has not got the electricity or water supply benefits from the dam. Rampur town, which was promised a future of *chaman* (heaven) by no less a person that former prime ministers Nehru and Shastri, stands destroyed as a commercial hub of the surrounding villages and the only industry in the town has been closed down as it did not get regular electricity. The story is not different from other big dams of India, but it once again underscores the reality that big dams do not equate to development.



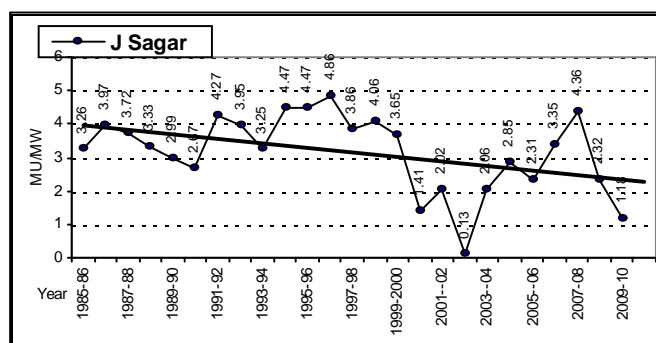
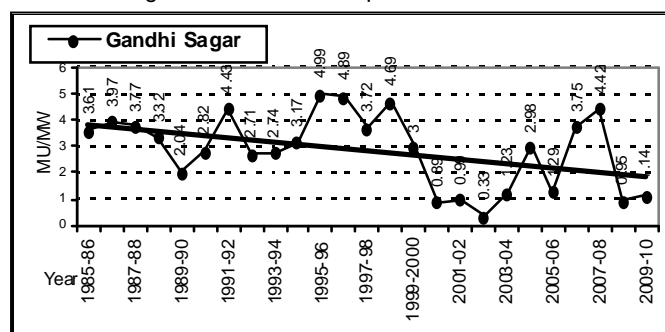
Pathetic power generation performance The graph on the previous page shows how the combined generation of the three projects (Gandhi Sagar, Rana Pratap Sagar and Jawahar Sagar) is declining over the last 25 years for which we could get figures from Central Electricity Authority under RTI and through monitoring the website of CEA over the years. The graphs for individual power generation from the three projects over the same period are given here. They show that power generation from each of the project has dropped by over 25% during the last 25 years. No questions are being asked why this is happening. Increased water use in the upstream and siltation in the reservoirs give only part of the answers.

There is another way to look at the power generation performance of these dams. The projects were given techno economic clearances based on promise of certain generation that is called design generation and that is supposed to be achieved in at least 90% of the years. In the table below we have given how the projects have performed in this respect.

Power Generation Performance of Chambal Dams

	Gandhi Sagar	Rana Pratap Sagar	Jawahar Sagar	Total
Design generation	420	459	298	1177
Actual generation	114	240	200	554
% under performance	72.86	47.7	32.89	52.93

Generation figures in Million Units per annum

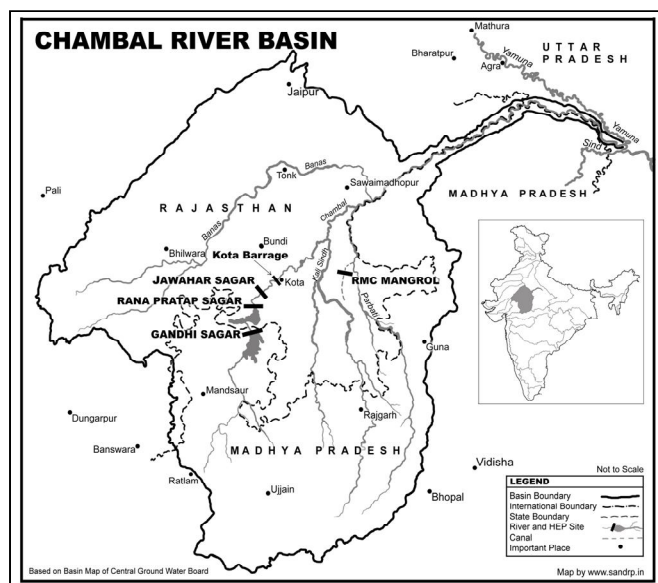


It is clear from these figures that the performance of the project has been very poor. The three projects collectively were expected to generate 1177 million units or more in 90% of the years. From the official generation figures of last 25 years, the projects have collectively generated 554 MU at 90% dependability, which means the actual generation has been below the even 50% of the design generation.

The % under performance for Gandhi Sagar, Rana Pratap Sagar and Jawahar Sagar has been 72.86%, 47.71% and 32.69% respectively. Gandhi Sagar has been the worst performer in this respect in the last 25 years.

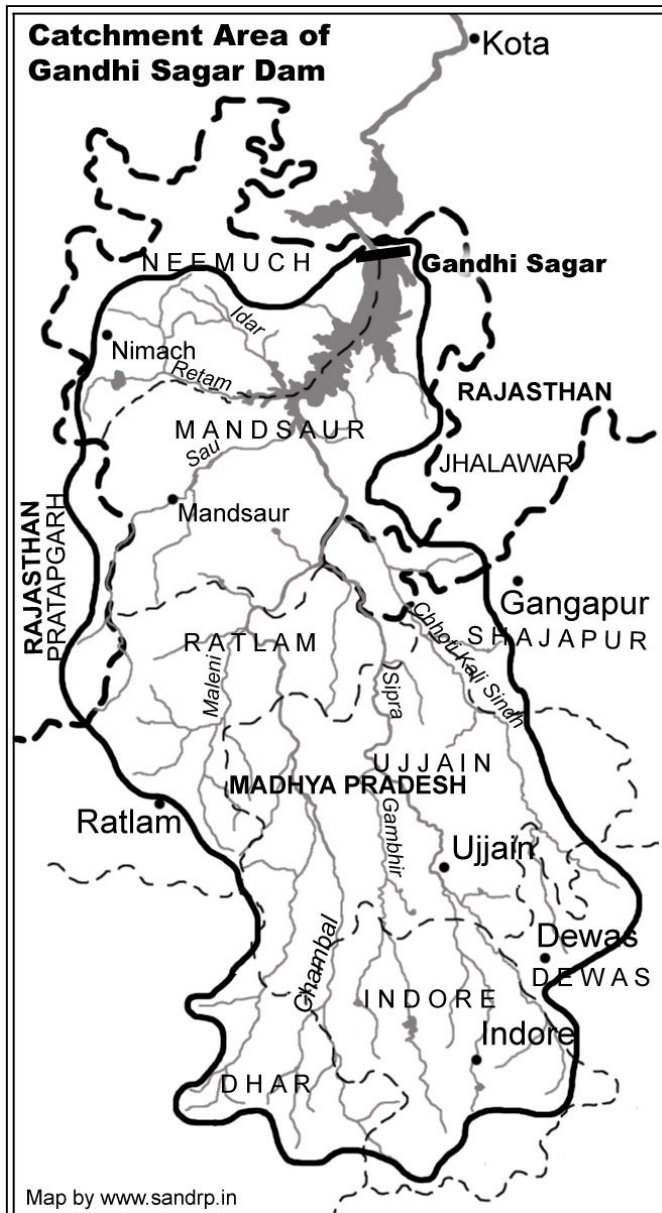
Pity is, such performance appraisal has never been done for any of the over 4700 large dams built by India in last 63 years. So the question of asking, as to why this is happening, who is responsible, what lessons one can learn etc does not even arise.

Desertification of the catchment Another impact of the project has been in the catchment area of the Gandhi Sagar



Dam. As pointed out at the convention by Prof Ram Pratap Gupta, who has done a remarkably detailed research on the various aspects of performance of the Gandhi Sagar Dam over the last two decades, there was a clause in the inter state agreement between Madhya Pradesh and Rajasthan, under which Madhya Pradesh agreed that no surface water storage or irrigation projects will be taken up in the Gandhi Sagar catchment districts that includes parts of Neemach, Mandsaur, Ratlam, Ujjain, Indore, Dhar, Shajapur and Dewas in MP.

However, there has been major groundwater use developed in these districts over the years. Thus, as per the latest (May 2009) reports from the Central Groundwater Board, while the Annual replenishable groundwater resource of Indore district is 569.02 Million Cubic meters, the actual net groundwater draft there is 594.26 MCM. The figures for Mandsaur (708.68 MCM vs use of 759.66 MCM), Shajapur (523.2 MCM vs use of 594.39 MCM) and Jhalawar (a Rajasthan district, whose small part is in Chambal basin, 430.82 vs use of 453.02 MCM). It seems that the catchment of Gandhi Sagar with annual average rainfall of 860 mm is seeing depletion of groundwater levels due to over exploitation on the one hand and lack adequate recharge of the groundwater through local water systems on the other hand.

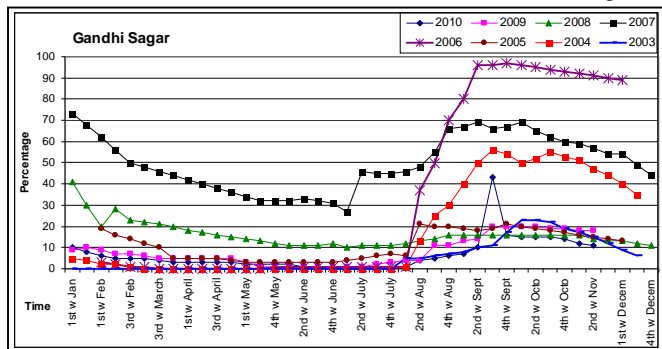


District wise annual rainfall in Gandhi Sagar Catchment districts (mm)

	2005	2006	2007	2008	2009
Neemuch	746.5	1352	501.6	813.2	681.7
Mandsaur	744.6	1443.3	817.7	708.2	725.6
Ratlam	774.8	1634.3	1228.9	652.1	756.9
Ujjain	669.4	1768.4	1125.2	639.6	817.9
Indore	723.1	1234.2	960.5	670.6	965.1
Dhar	559.9	1083.4	1160.6	687.3	727
Shajapur	642.5	1628.3	1060.9	692.7	785.9
Dewas	609.6	1276.5	1013.3	404.6	779.7
Jhalawar	661.8	1087	726	618.7	689.2

Source <http://www.imd.gov.in/section/hydro/districtrainfall/districtrain.html>

The rainfall in the catchment districts of Gandhi Sagar dam is given above for the last five years. The long term data shows that the annual rainfall has not reduced significantly.

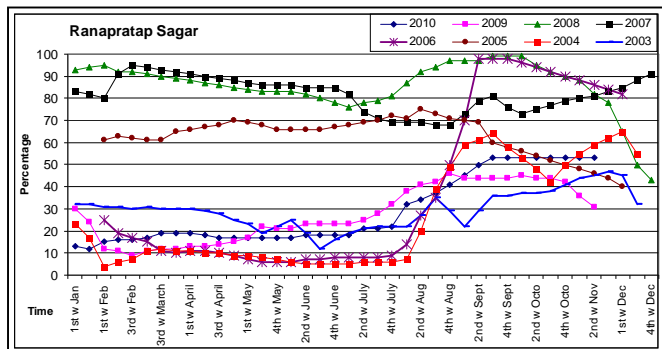


However, the reservoir filling graphs for Gandhi Sagar and Ranapratap Sagar, based on data available for the last eight years shows that Gandhi Sagar dam was filled to the capacity only once (2006) in these eight years, while even the much smaller Rana Pratap Sagar was filled close to the full capacity only thrice in eight years. This shows how hugely oversized these two reservoirs are. It is clear that there is a strong case for reduction in the FRL of Gandhi Sagar from current 1312 feet (399.9 m) to 1295 feet (394.72 m). At 1295, the reservoir capacity will be 55% of the current reservoir capacity, which too got filled up only

thrice in last eight years for Gandhi Sagar.

Unsafe dam There is another reason also why the FRL of Gandhi Sagar dam needs to be reduced. As pointed out by Prof Gupta at the meeting, the Central Water Commission had declared in 1990 that considering the probable maximum flood that the dam is likely to receive in view of data available after the dam was completed, the spillway capacity of the dam is much lower than such floods it could receive. In such a situation, the operation of the dam at current FRL becomes unsafe and there was need to increase the Maximum Water level to 1316 feet. But Madhya Pradesh and others concerned disagreed with the proposition of higher MWL since the dam was filling up just once in a decade even at current FRL and there was no justification in putting additional area at risk of submergence. The CWC then concluded that in that case, the current dam operation is much more risky or in simpler words, it is unsafe.

Here it may be added that the Gandhi Sagar dam has 10 spillway gates and nine sluices for releasing flood. However, the sluices have not been operated for many years since the dam operators found that they could not close it when they opened it on a previous occasion. This further reduces the flood release capacity of the dam. In these circumstances, if the FRL of the Gandhi Sagar dam is reduced to 1295 and dam is so operated that till the end of the monsoon, sufficient space is left empty below the new FRL, than the operation of the dam would also become safer.



The reduced FRL of 1295 feet would also be appropriate considering the 75% dependable inflow expected into Gandhi Sagar Dam. Approximately 35-40 000 ha of land that would become available can be distributed among the affected people, and this will a long way in undoing the injustice done to them.

Conclusion There was palpable anger at the Rampur meeting. The dam had displaced some 228 villages and no worth while rehabilitation has happened. On the contrary, people have only suffered for 50 years. It may be good idea for the Rajasthan, Madhya Pradesh governments and

also the central government agencies of Planning Commission, Central Water Commission, Union Ministries of Environment and Forests and also Water Resources to accept this proposal rather than allow the movement of dam affected to snowball into a demand for decommissioning of the dam. An important demand made by the convention at Rampur was that the government should set up credible, independent commission to review the performance of all aspects of the Chambal basin projects and consider the various options for the projects. Such a review can help arrive at a way to arrive at appropriate decision in this regard. It is important that this reasonable demand is accepted immediately so that the dissatisfaction of the affected people of Chambal Valley is addressed and not allowed to snowball into something more problematic.

Himanshu Thakkar
(Maps, tables and graphs by Swarup Bhattacharya)