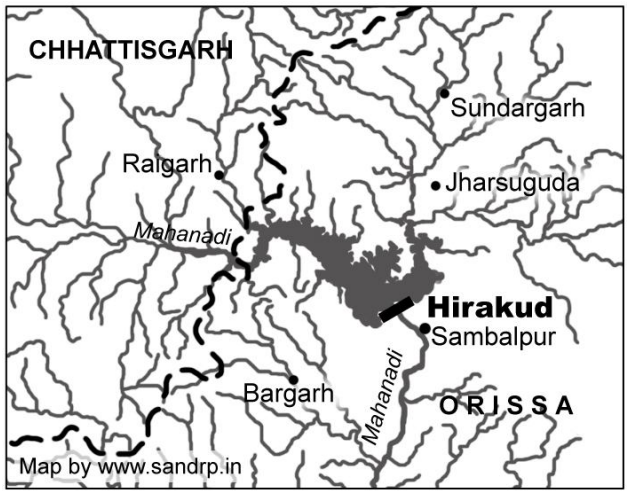
Hirakud Dam: Fifty Mournful Years

Government's false promises, poor management of Hirakud dam and the dissatisfaction of farmers, displaced persons and the locals have led to the people's movement against the dam. The following essay not only brings into limelight the mismatch between objectives behind the construction of the dam and the actual output, but also holds "Hirakud Dam" as a true example of recklessness of the Orissa government. The dam, which was essentially planned for flood management in the delta of Orissa, irrigation, fishing and hydropower production, now quenches thirst of industries at the cost of the aforesaid objectives. This poses greater threats to the livelihoods of thousands of farmers who depend upon the water from the Hirakud reservoir. The dam which took shape from the tears of one and half lakh people, now provides water to a handful of industries - a satire to humanity, one can say.



The dam, which was essentially planned for flood management in the delta of Orissa, irrigation, fishing and hydropower production, now quenches thirst of industries at the cost of the aforesaid objectives. The dam which took shape from the tears of one and half lakh people, now provides water to a handful of industries - a satire to humanity, one can say.

The temple of modern India On 8th November 1945 Late Dr BR Ambedkar presided over a meeting in Cuttack. In this meeting seeds for a multi-purpose dam project is sown for the over all development of Mahanadi river valley. As a result of this, projects were proposed at Hirakud, Tikarpada and Naraj. The core objective of these projects was to save Orissa from the clutches of repeated floods and famines. And the injuries from the great famine in 1865-66 and the flood in 1937 were still fresh. Only within the period 1868 to 1940 Orissa witnessed 63 floods. So the purpose behind constructing Hirakud dam was to prevent Orissa from flood. 1.83 Lakh ha land and reserved forest sank under the waters of the reservoir to construct the dam among which only cultivated land amounted to 1.23 Lakh hectares. In the process 26501 families of 249 villages in Orissa were displaced. 34 villages of the then Madhya Pradesh were displaced, too. On 15 March, 1946 Mr Louise, the then Governor of Orissa laid the foundation stone for Hirakud dam.

Karunakar Supkar, an engineer by profession and an eminent activist from the local area states that in the period of construction of the dam only Land Acquisition Act was implemented and no policies for the rehabilitation and resettlement of the displaced people were framed by the state government. In the months of April and May of 1955, 57 villages of the "*Hirakud budi anchal*" (submerged area of Hirakud) were evicted with use of police force. Those who had *'patta's* (written ownership of land) got meager compensation. People depending upon the community resources were left with empty hands. Their number would be 40,000-50,000. Till date, compensation could not reach 3540 families.

On 12th April 1948, late Pundit Jawaharlal Nehru, then Prime Minister of the nation laid the foundation stone of the dam for the second time and Hirakud dam was named as the *"temple of the modern India"* by him. A barrage in Mundali, an additional power house in Chipilima and other constructions in the delta area followed. On 13th January 1957 Hirakud dam was formally inaugurated by Pundit Jawaharlal Nehru. From 1956 the process started for irrigation and hydropower generation. In 1966 this dam attained its full potential.

Planned role in flood control Before the construction of the dam regular floods wrecked Orissa. It was assumed that prior to the dam land in Mahanadi River valley and in Brahmani, Baitarani and other river valleys were subjected to regular floods. Dr Khosla's report states that Hirakud dam was capable of managing 9.5 MAF (Million Acre Feet) flood water. The earlier plans contained clauses like the drained water released from the dam should never cross the 90 feet level at Naraj, closure of the flow at Banki and Mancheswar, closure of some spills in Kushabhadra, Bhargavi and Daya rivers and emptying a part of the reservoir to accommodate the run-off in the monsoon period for flood management. In this plan the delta area and the Sambalpur town were essentially given protection from floods. In the earlier plans the full reservoir capacity and the minimum reservoir capacity were estimated at 4.72 MAF and 1.88 MAF respectively. For this 64 sluices were constructed. The overall capacity of the spillway was estimated at 15 Lakh cusecs.

Planned role in irrigation In the proposed plan in 1947 the total irrigated land was estimated to be 350 000 Ha which included 198000 Ha for flow irrigation and 157 000 Ha for lift irrigation. Later on the revised plans estimated 235 477 Ha of irrigated land by the reservoir which included 159 109 Ha for Kharif and 79 371 Ha for Rabi cultivation. It was reported by the govt that the reservoir has the potential for irrigating 108 315 Ha of land in Rabi cultivation. In the 1953 report, due to cost effectiveness hydropower production was given priority instead of lift irrigation. Not only this, 10.76 Lakh ha of land was estimated to be irrigated by Mundali barrage to achieve irrigation potential in the delta area. This also contained renovations in many barrages across Mahanadi and Birupa rivers at Jobra and Jagatsinghpur. With these renovations 2.2 Lakh ha in Puri and Cuttack districts and an additional 1.364 Lakh ha land by renovations were planned to be irrigated. In the plans, for Kharif and Rabi cultivation, provisions were made for 100% and 40% irrigation respectively.

Planned role in hydro-electricity production When plans were framed for the construction of Hirakud dam, two things were given attention regarding hydro-electricity production i.e. the capacity of the reservoir in producing power and the installed capacity of the power plant. For this the Full Reservoir Capacity and Minimum Reservoir Capacity, total inflow and the evaporation rates were taken into consideration. The hydroelectricity production was the third major objective behind construction of the dam after flood control and irrigation. In the early plans provisions were made for an additional reservoir at Chiplima with a 350 MW installed capacity. In the first stage Burla Power House and in the second stage Chiplima Power House was constructed (in 1962). The installed capacity of seven generators in Burla Power House was 235.5 MW and the installed capacity of three generators in Chiplima Power House was 72.0 MW.

Planned vis-à-vis Actual output In his report in 1946, dam engineer MG Rangaiyya expressed that after the dam is constructed the losses will outnumber the gains from the dam. Actually, in the last fifty years Hirakud dam is flooded with many controversies. The disastrous floods in Orissa due to wrong operation of the dam, multiple movements for displacement and compensation, dispute between farmers and industries regarding distribution of Hirakud waters, rapid decrease in the reservoir capacity, decrease in the fish production due to polluted waters etc put a question mark to the usefulness of the dam. Moreover, livelihoods of thousands of people came under stake due to this shift in objectives.

Is flood the result of the dam? The statistics show that the dam failed in resisting moderate floods. Out of the 141 600 square kilometer catchment of Mahanadi river valley, the dam checks the runoff from 83 400 square kilometers. According to its capacity, the dam is designed to check only 4.72 Million Acre Feet runoff. The threat increases with the growing inconsistency of the rainfall pattern in the region. A part of the reservoir is needed to be kept empty in the summer to accommodate the rain water in the monsoon period. But the demand for electricity and industrial intake in summer becomes a compulsion for not following this norm.

While analyzing the pre-dam and the post-dam period with flood pattern, it is found that the large and devastating floods have come down from 76% to 42% while the small and moderate floods increased from 24% to 58%. In the pre-dam and post-dam period, the short term floods showed a declining trend i.e. from 64.5% to 30.8%, the medium-term floods increased from 12.9% to 28.5% and the long term floods increased from 12.9% to 38.5 %. In 1982, 2001 and 2006, the dam was unable to control the flood water successfully.

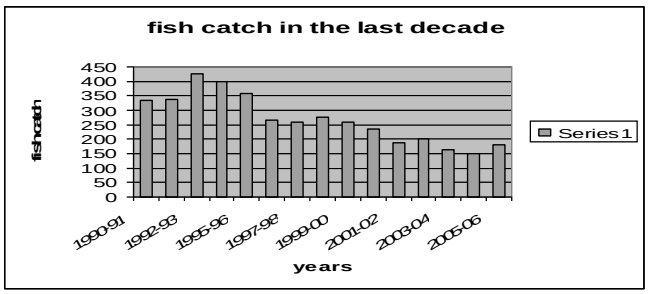
Irrigation Ahmedabad based "Development Support System" had analyzed the irrigation potential of various mega dam projects of the country for Central Planning Commission. The report states that In Hirakud project irrigated area, all the fields are irrigated in the upstream of canals, 35% fields are irrigated in the middle stream and in the down stream only 18% fields are irrigated. In the prior plans for the project, 159 106 ha were provided for Kharif cultivation and 108 385 ha were provided for Rabi irrigation. Now according to government sources 79371 ha are cultivated in Rabi season. In the delta area plans were made to provide irrigation to 251 000 ha in Kharif and 11 498 ha in Rabi. But now the Rabi cultivation area has decreased. In 2006, the local farmer activists argued that in the last ends of the irrigated area, 8000 ha are not getting water. The fields once irrigated by *lower Huma distributary* (of Sason canal) has already become tail area. The cause of shrinking irrigated fields lies in the reduced capacity of the reservoir due to silt deposition, reduced inflow, provision of water to the industries etc. From the 83 400 square kilometer catchment area of the dam, 75,229 lie in Chhattisgarh.

Power Generation The major two reasons of the cut in electricity generation in the last decade are the reduction in the capacity of the power houses and the reduction in the capacity of the reservoir. In its report of August, 2007 the technical committee predicted that by providing 0.5 MAF water to industries the power production will reduce by 46.9 Million units.

Threat to fish production Another objective behind construction of Hirakud dam after flood control, irrigation and hydroelectricity production was "fish production". In the last fifty years, fish production suffered a lot and the livelihoods of nearly 4000 fishermen of 250 villages as well. Not only the production in quantity suffered, but also several species are now hard to find. Among the 104 species of fish present in the river at the time of

construction of the dam only 43 species are left in these days. In the reservoir different species of fish, namely, *Rohi, Bhakur, Mirkali, Lunia, Kala bainsi, Fali, Singhar, Balia, Fufud, Kerandi, Chingudi* etc are rapidly becoming extinct. The fishermen of Mahammedpur sector complain that the waste water of different plants when released into the reservoir or feeding rivers results in a typical disease *'Kshata rog'* among the fishes. This brought down the catch. The fishery department keeps the fishermen in dark as to the quantity and the types of fish seeds released into the reservoir. So they do not trust the department. There are stringent reservoir rules like using fishing net wider than two inches width, restriction on plants to release waste water into the reservoir, restriction on fishing in the breeding time etc. But they are not followed. Due to the use of *Dulungi Jaal* (close knitted net) and presence of Mafia, the fish population is over exploited. After 1968, the number of fishermen also increased. While in 1968, 164 fishermen families were dependant upon fishing as the sole means of livelihood, during 1999-2000, due to facilitation by different cooperatives, 3030 fishermen families were dependant upon fishing for earning a livelihood. The number is ever increasing even with the ever decreasing catch in the reservoir. Now the per head catch figure has come down from 347 KGs to 61 KGs. Due to deposition of Mercury, Chlorine and use of other pesticides in the fields, the catch is reducing in the reservoir.

Another threat to fishermen's livelihood is the presence of *Mafia* in the fish business. The Mafia people purchase fish at a very minimal rate and sell it to the customers at a dearer price. For this the fishermen cooperatives are suffering from loss and hence due to poor economical condition they are exempted from any loan or subsidy by the government. In many instances the societies sub-leased their sector to the Mafia not being able to meet losses. There are six sectors for fishing in the reservoir area. While five are leased to the fishermen cooperatives, the sixth one is kept by the fishery department to itself.



Diverting water to industries Diverting water to industries was not the objective nor was any provision of water for the industries made in the original plan of the dam. Primarily from middle 90's and afterwards in the middle of the current decade, a number of industries lined up for drawing water from the reservoir. Prior to 1997, 31912 Lakh gallons of water was diverted to industries annually from the reservoir. It constituted 6 % of the total water provisioning to industries in the state. After the reconstruction of the water resource department in the 1997, a committee formed for water distribution. This committee permitted the industries for the drawing more water. Till 2007, water provided annually to industries from the reservoir amounted to 862 735 Lakh gallons. This was more than 27 times from the water diverted to industries in 1997.

How much water should be provided? The technical committee report in 2007 puts light upon the storage capacity of the reservoir. Prior to this there were multiple surveys conducted like: survey in 1957, survey in 1988 by recommendation rule curve committee, three phase survey in 1986, remote sensing survey in 1995 and report of 2000 etc. The surveys were conducted for various reasons. But the expert committee's report assessed the storage capacity of the reservoir and found out whether irrigation will be affected by diverting water to industries. This report has been severely criticized by different farmer's organizations and resource persons. The report stated that agriculture will not suffer and hydro electricity will be partly affected by providing 0.5 MAF water to industries in the monsoon and 0.334 MAF in non-monsoon period.

The storage capacity of the reservoir is imagined taking into consideration the Full Reservoir Level at 630 feet. And to fulfill demand of industries 3.91 MAF is assumed to be available in the reservoir at the FRL of 630 feet. But statistics show that the average reservoir level hovers around 627 feet. In 1966, 1974, 1979 and 2000 the Reservoir level at its peak was less than 620 feet. It is difficult to assess the storage capacity of the reservoir taking into consideration the filling of the reservoir in any one year. The waste deposition into the reservoir by different industries is rising at an alarming rate. The amount of dependable flow from the reservoir cannot be predicted. The report says that 2.71 MAF water released from the dam will irrigate 267 960 ha in the first stage and 203 622 ha in the second stage in the delta area. But in the context of increased supply to industries, it can not be guaranteed that the released water will be the same 2.71 MAF in the coming years.

Total reservoir storage capacity (1995)	4.00 MAF
Reservoir storage capacity: 2007 estimation	3.77 MAF
Loss in the storage capacity	20.12%
Estimated reservoir capacity after 25 years	3.29 MAF
Average reservoir capacity in next 25 years	3.53 MAF
Average predicted inflow in the next 25 years	1.56 MAF
Total of storage and inflow (water available)	5.09 MAF

Impact on the environment After the construction of the dam, in 1965 Sambalpur tasted the bitterness of famine. In the last decades in western Orissa there is increase in general evaporation rate. In the post-construction period desertification has started in the area. The reason behind this lies in the destruction of

1600 Ha reserved forest and 20400 Ha village forests for the dam. Now the industrial houses are rendering their share in destroying the remaining forest. For this reason people do not find dew drops, nor do they feel the earlier cold waves of winter in the local area. In many rain shadow areas of Bargarh there are no Mangroves or forests. The nature of climate change has put its adverse impact on the rainfall pattern of the region. In earlier times there was folklore about 8 days of heavy rain, 16 days of moderate rain, 32 days of slow rain and 64 days of drizzle (*Varsha chaturmasya*) for healthy crops. Now this has come down to 50 days in total. In the earlier plans the rainfall recorded as in the Mahanadi valley was 1381.25 mm annually. But looking at the rainfall pattern since 1958 till 2003, it can be said that the annual average rainfall has come down to 1132 mm in the region. With the fall in total rainy days and total rainfall, the irregularity of rain increased. Due to more stress on canal irrigation, the traditional harvesting structures are getting neglected. The canal is not capable of irrigating fields in the last end.

Government promised for land against land, house against house and ideal resettlement colonies to the people displaced. These promises were never kept. The first among the displaced, the villagers of *Jamada* village got only 519 rupees and 5 'anna's for 27 acres and 76 decimals.

When Hirakud dam was built, its storage capacity was 5818 million cubic meters (MCM). In 1988, the capacity was estimated at 5375 MCM. Now it is around 4637 MCM. The experts say that 4637 MCM of water and 1181 MCM silt can be a factor in making the dam unsafe. Hirakud dam is situated in the earthquake zone 3. In the past, the water level of reservoir was less than the minimum level i.e. 590 feet RL on two occasions. The case of Koyna beach situated at 241 kilometers from Mumbai can be taken as an example. In 1967 and 2005 Koyna witnessed devastating earthquakes which took 200 casualties. Experts made the Koyna dam responsible for increasing the vulnerability. This can also be feared in case of Hirakud dam. If the dam breaks, then the property loss and the death toll will be beyond imagination. Urbanization flourished in the banks of the river and the nearby areas of the dam in recent times. If the dam breaks, it is predicted that Cuttack town will be flooded within 6 to 24 hours. Many habitations within Cuttack and Paradeep in the delta area will be washed away. Sambalpur, Sonepur and Banki, all situated at the banks of Mahanadi, will be subjected to massive destruction. For this there is no satisfactory provision in the disaster contingency plan of the state government.

At the time of construction of the dam, different traditions and cultures of the people of western Orissa were affected severely due to bitterness of displacement. The displaced people lost connections with their neighborhood and community assets. Now due to diverting water to industries, livelihoods of thousands of farmers and fishermen are at stake.

Now mining activities are being undertaken near the reservoir area. Adding to this, many heavy metals like mercury etc are dumped into the reservoir with other wastes.

Social dislocations and disturbances Diversion of water to industries has been the reason of farmers' dissatisfaction over the years. In four stages *Orissa Krushak Sangathan*, a state based organization, has agitated on the issue of water distribution and priority to industries. On many issues like illegal construction of Bhusan Industries Ltd in the reservoir area, faults in irrigation, corruption in the renovation of Sason canal and water scarcity at the outlet of Sason canal, this organization demanded place for people's voice. In the first stage, the organization mailed large number of letters by farmers to the president of India. Through this, poor farmers expressed their grievances in their own words. In the second stage, on the national highway covering 18 kilometer distance from the Jawahar Minar situated in Burla to Gandhi Minar situated at Hirakud, on 26th Oct '06, two thousand farmers formed a human chain. In this protest, farmers of the nearby districts, many voluntary organization representatives and social workers participated.

In the third stage of the protest farmers called for an open dialogue with the local political leaders. Thousands of farmers participated in this meeting and demanded the government to produce a white paper. Out of the fifteen politicians invited only one representative attended the meeting. The farmer leaders complained of non cooperation on the part of the district administration.

In the fourth stage of protest in Nov '07 farmers held non cooperation movement. This was followed by a *lathi charge* of police upon the farmers who were protesting peacefully for not diverting Hirakud waters to industries. In the *lathi charge*, many people were injured. After this incident the politicians were also forced to take up people's issues.

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The game of compensation and resettlement Among the people displaced those who got meager compensations were settled in 18 resettlement camps.

Those who wanted to settle outside camps and around the nearby areas were provided with homestead and farming land through *DC Patta*. The local administration had asked for 4403 ha forest land for sale to the displaced people. From this, 3153 ha were sold and 1350 ha remained as unsold as there was no irrigation facility.

In this context, the dam which was earlier looked upon as the temple of modern India is now regarded as a cancer to the development. Fifty years have passed since the construction of the dam, but till now a post facto cost-benefit analysis has not been done for Hirakud.

In 1993 a committee is constituted to provide remaining compensation to the displaced with the following terms:

- Those who availed total compensation will not get any further compensation.
- Those who are displaced and their lands are acquired will get Rs 25000/- per ha as gratuitous compensation.

To give effect to above terms the collector estimated the compensation amount to be Rs 2.67 crores. In this the compensation for trees, other assets, wells etc were not taken into consideration. 3540 families were identified for receiving compensations. On 7th September 1993 the state government sanctioned Rs 1 crore. After identifying 977 displaced families in Sambalpur district Rs 27 lakh was allotted as compensation to them. Lastly 457 families were given Rs 26.49 lakh as compensation.

What is the life of this dam? Till how many days the dam can serve the common people's needs? How safe is the dam? How safe is its operation? How can the dam and its operation be made more accountable to the people? Why not carry out a credible post facto evaluation of the dam? Why not assess the role of the dam in the floods in Orissa in September 2008?

The *Jhankars* and *Chaukidaars* among the displaced people were to get 50% of the compensation money as gratuitous compensation. For this Rs 4.9 lakh was allotted but not all spent. The unspent amount was used in developing irrigation projects in resettlement camps.

Government promised for land against land, house against house and ideal resettlement colonies to the people displaced. These promises were never kept. The first among the displaced, the villagers of *Jamada* village got only 519 rupees and 5 'anna's for 27 acres and 76 decimals. From among the displaced by Hirakud, some families were displaced for the second (and third time) due to various industrial projects like Hindalco, Bhusan ltd, Ib Thermal Power etc. From the amount estimated as compensation, more than 35% remained unspent. In 2002, government declared that all the family heads and legal heirs of displaced families are entitled to get 4 ha land each. This has not yet been implemented. In 1988, the Chief Minister of Orissa, answering to a question in the assembly said that Rs 15.41 lakh is pending with the treasury office of Sambalpur which was meant to be paid to the private land owners because they could not come to take compensation. A committee was formed in 1989 which could not improve the situation.

Even now the people of *Hirakud Budi Anchal* hope to get compensation. The government has enough money, but it does not have the intent to spend. For the proper distribution of the compensation money, a separate infrastructure is needed with responsible administrative officers.

The present situation Like the other big dams, due to silt deposition the storage capacity of Hirakud dam is decreasing. This also enhanced the chances of massive floods. The *Rabi* cultivation is suffering. If the rainfall reduces, *Kharif* will also suffer.

Assessing the hydro power production, it can be said that in near future the power production will go down as there will be less outflow from the dam after meeting demands for industries. This will follow a heavy reduction in the *Rabi* cultivation in delta area. To save irrigation and the dependant livelihoods, the short term relief can be sought from maintaining the canals and developing remaining irrigation infrastructures.

What we got from Hirakud dam The local people have gained least from the project. The displaced have suffered the most. The government has not got enough revenue from the hydro electricity production. For the 8000 ha tail end area irrigation has been a failure. In this context, the dam which was earlier looked upon as the temple of modern India is now regarded as a cancer to the development. Fifty years have passed since the construction of the dam, but till now a post facto cost-benefit analysis has not been done for Hirakud.

Now there seems to be a shift in the objectives. Several questions too come to mind: What is the life of this dam? Till how many days the dam can serve the common people's needs? How safe is the dam? How safe is its operation? How can the dam and its operation be made more accountable to the people? Why not carry out a credible post facto evaluation of the dam? Why not assess the role of the dam in the floods in Orissa in September 2008? And many more.

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