Sub: Minutes of the Meeting of Hon’ble Chief Ministers of Odisha & Chhattisgarh held under the Chairpersonship of Hon’ble Union Minister MoWR, RD & GR to consider various water resources issues in Mahanadi Basin At 12.00 Noon on 17.09.2016 at New Delhi.

The undersigned is directed to refer to the meeting held on 17.9.2016 under the chairpersonship of Hon’ble Minister of Water Resources, River Development and Ganga Rejuvenation at Sharam Shakti Bhawan, New Delhi and to enclose herewith a copy of minutes of above meeting for information and appropriate action in the matter.

Encl:- as above

(Satish Kamboj)
Sr. Joint Commissioner (PR)
Telefax: 23388020
Email: cadwmccentral-mowr@nic.in

To
1) Chief Secretary, Government of Odisha, Bhubaneswar, Odisha.
2) Chief Secretary, Government of Chhattisgarh, CM Secretariat, DKS Bhawan, Mantralaya, Raipur, Chhattisgarh - 492001.

Copy to:-
2) Principal Secretary, Water Resources Department, Government of Odisha.
3) Secretary, Water Resources Department, Government of Chhattisgarh, CM Secretariat, DKS Bhawan, Mantralaya, Raipur, Chhattisgarh - 492001.
4) Member, WP&P, CWC, Sewa Bhawan, RK Puram, New Delhi
5) Chief Engineer (PAO), CWC, Sewa Bhawan, RK Puram, New Delhi

Copy also to:
1) PS to Hon’ble Minister (MoWR, RD&GR).
2) PS to Hon’ble Minister of State (MoWR, RD&GR).
3) PS to Secretary (MoWR, RD&GR).
4) PS to OSD (MoWR, RD&GR).
5) PPS to Additional Secretary (MoWR, RD&GR)
6) PPS to Joint Secretary (PP & PR)
MINUTES OF THE MEETING OF HON’BLE CHIEF MINISTERS OF ODISHA & CHHATTISGARH HELD UNDER THE CHAIRPERSONSHIP OF HON’BLE UNION MINISTER MOWR, RD & GR TO CONSIDER VARIOUS WATER RESOURCES ISSUES IN MAHANADI BASIN ON 17.09.2016 AT 12.00 NOON AT SHRAM SHAKTI BHAWAN, NEW DELHI

An Inter-State Meeting was held on 17.09.2016 under the chairpersonship of Shushri Uma Bharti, Hon’ble Union Minister, M/o WR, RD & GR with Shri Naveen Patnaik, Hon’ble Chief Minister of Odisha and Dr. Raman Singh, Hon’ble Chief Minister of Chhattisgarh to consider the various water resources issues in Mahanadi Basin. The meeting was attended by Shri Brij Mohan Agrawal, Hon’ble Minister Water Resources Chhattisgarh, Shri Debi Prasad Mishra, Hon’ble Minister Industries, S& ME Odisha, Shri Pushpendra Singh Deo, Hon’ble Minister H & UD, Odisha, Senior Officers of both the States, Ministry of Water Resources, River Development & Ganga Rejuvenation and Central Water Commission (CWC). The list of participants is at Annexure I.

At the outset, the Hon’ble Union Minister welcomed the participants. She directed officers of the MoWR, RD & GR to present the water scenario in the Mahanadi Basin followed by presentations by the two States. Initiating the discussions Dr. Amarjit Singh, Officer on Special Duty (OSD-WR), told about the decisions taken in the Chief Secretary level inter-state meeting on 29.07.2016 and stated that both states had agreed to share the data related to water resources projects. He also stressed the need for establishment of the Joint Control Board. Thereafter, Director–Hydrology, CWC made the presentation (Annexure II) about water scenario in Mahanadi basin. He explained the state-wise details of the drainage areas in the Mahanadi Basin, major water resources, distribution of catchment area, structures and projects. The 29 year data of runoff observed at the three terminal sites of CWC upstream of Hirakud dam both during monsoon and non-monsoon did not show any downward trend. Further, the annual inflows to Hirakud dam both during monsoon and non-monsoon for the last 29 years also did not show any decreasing trend.

This was followed by presentations by Chief Secretary, Govt. of Chhattisgarh (Annexure III) who gave an overview of the comparative status of water resources in Chhattisgarh and Odisha, river basins in Chhattisgarh, drainage and inflow profile and analysis of Mahanadi basin and at Hirakud dam. He also touched upon the various ways in which Government of Odisha is utilizing the Hirakud waters, highlighting the change in scope of the original intent in this project. With regard to six barrages which are under construction on Mahanadi
(namely Samoda, Sheorinarayan, Basantpur, Mironi, Saradih and Kalma), he stated that these are minor structure and no diversion weirs. These six barrages have no canals and as such they will store only monsoon water. Proposed aggregate irrigation area from all six barrages is 3,149 hectares through pumps. Since each project individually has less than 2,000 hectares irrigation potential, hence each of them falls under Minor Irrigation Projects category. Storage capacity of all these barrages taken together is only 274 MCM. Total industrial use in non-monsoon season will be only 552 MCM. Thus, utilization from non-monsoon flow will only be (552-274=) 288 MCM, whereas, average non-monsoon flow at Hirakud is 4446 MCM. He reiterated the position of Government of Chhattisgarh that a Joint Control Board may be constituted as per the agreement between the erstwhile undivided state of Madhya Pradesh and the State of Odisha dated 28.04.1983, to look into the complete range of issues in Mahanadi basin. He requested for establishment of CWC gauging stations immediate upstream of Hirakud at the inter-state border on Mahanadi, Kelo, and Mand rivers to monitor the exact flow of monsoon and non-monsoon. The Chief Secretary, Chhattisgarh also presented a list of projects undertaken by Odisha, downstream of Hirakud in which the Government of Odisha did not consult the upper riparian state.

Principal Secretary (Irrigation), Odisha in his presentation (Annexure IV) after explaining the profile of Mahanadi basin, elaborated that in its original intent, the scope of Hirakud dam included flood control, irrigation, power, transport and domestic use. He stated that non-monsoon inflow in Hirakud dam, during the last 13 years, has shown a downward trend. He expressed apprehension that the under construction projects in Chhattisgarh will adversely affect the future flows downstream in Odisha. He referred to some unauthorized constructions especially projects of Chhattisgarh considered by CWC with respect to which they had not received any information. The six barrages mentioned by Chhattisgarh were in his opinion industrial barrages, with storage potential of 829 MCM of water even during non-monsoon season.

The Development Commissioner, Odisha briefed the house about the fragile ecology of coastal areas and Mahanadi flood plains. He made special reference to ecological hotspots like Mahanadi delta, Chilika lagoon, Bhitarakanika Wetlands, Gahirmatha (Oliver-Ridley turtle habitat) and Satkoshia Wildlife sanctuary. He feared that the ongoing construction works in Chhattisgarh on Mahanadi may prejudice the environment and ecology in the downstream part of Mahanadi River in Odisha. He pleaded that a high level Inter-Disciplinary Expert Committee may be constituted comprising members from both the States, water experts, along with members from
Central Ministries to look into the comprehensive water and environmental issues in the Mahanadi Basin.

Hon'ble CM of Odisha desired that work on all ongoing projects in Mahanadi basin in Chhattisgarh state should be stopped for three months and an Expert Committee may be formed to study the impact of projects in Mahanadi basin and give its report within three months.

Hon'ble CM of Chhattisgarh said that 57% of Mahanadi water is flowing to sea without any use in the basin. The Mahanadi River has sufficient water to meet the requirements of both the states. He desired that they should agree to form Joint Control Board as mentioned in 1983 agreement. Further, Govt. of Chhattisgarh stated that most of the ongoing projects were started 10 years back and they are in their final stages of completion. Hence, it is not possible to stop the construction work on these projects.

Hon'ble Union Minister stated that since water is in the state list of the Constitution, the Union Govt. has no authority to intervene in the state subject. However, the Union Govt. can facilitate the state governments to resolve inter-state issues, if required. After detailed discussions on various issues following decisions were taken in the meeting:-

(i) Special Committee under chairmanship of Dr. Amarjit Singh, (OSD) will be formed. The committee will list out the water resources projects in Odisha and Chhattisgarh those have been constructed or are under construction without the approval of Technical Advisory Committee (TAC) of MoWR, RD & GR. Different teams will be sent to these states for this work. The committee will submit a report within a week’s time. Hon'ble Union Minister asked the states to put on hold the project construction works for one week.

(ii) The gauge and discharge sites will be opened at inter-state border of Odisha and Chhattisgarh at a location, for effective measurement of flows from Chhattisgarh catchment into Hirakud dam.

(iii) A detailed study of water availability of Mahanadi basin may be carried out by National Institute of Hydrology (NIH), Roorkee.

(iv) Govt. of Odisha suggested formation of an Expert Committee. Although Chhattisgarh was in favour of establishment of Joint Control Board for long term solution, it agreed to the formation of an Expert Committee as suggested by Odisha. The member of the Expert
Committee will include experts from different fields and representatives of both the states.

Hon’ble Union Minister (WR, RD & GR) requested both the States to take care of the needs of the neighboring state and to remain sensitive to each other. She stated that water is for love, not for wrangling.
ANNEXURE- I

List of Participants of the Meeting held on 29.07.2016 in Shram Shakti Bhawan, New Delhi.

MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Officer</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sushri Uma Bharati</td>
<td>Hon’ble Union Minister - in chair</td>
</tr>
<tr>
<td>2</td>
<td>Shri Shashi Sekhar</td>
<td>Secretary</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Amarjit Singh</td>
<td>OSD (WR,RD&amp;GR)</td>
</tr>
<tr>
<td>4</td>
<td>Shri U.P. Singh</td>
<td>Addl. Secretary (Pen. Riv.)</td>
</tr>
<tr>
<td>5</td>
<td>Shri Sanjay Kundra</td>
<td>Joint Secretary (Pen. Riv.)</td>
</tr>
<tr>
<td>6</td>
<td>Shri. Satish Kumar Komboj</td>
<td>Sr. Joint Commissioner (Pen. Riv.)</td>
</tr>
</tbody>
</table>

CENTRAL WATER COMMISSION

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Officer</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shri G.S. Jha</td>
<td>Chairman, CWC</td>
</tr>
<tr>
<td>2</td>
<td>Shri S. Masood Husain</td>
<td>Member(WP&amp;P), CWC</td>
</tr>
<tr>
<td>3</td>
<td>Shri Pradeep Kumar</td>
<td>Chief Engineer (PAO)</td>
</tr>
</tbody>
</table>

STATE OF CHHATTISGARH

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Officer</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr Raman Singh</td>
<td>Hon’ble Chief Minister</td>
</tr>
<tr>
<td>2</td>
<td>Shri Brij Mohan Agrawal</td>
<td>Hon’ble Minister, Water Resources</td>
</tr>
<tr>
<td>3</td>
<td>Shri Vivek Dhand</td>
<td>Chief Secretary, Govt. of Chhattisgarh</td>
</tr>
<tr>
<td>4</td>
<td>Shri G.S. Mishra</td>
<td>Secretary (WRD), Govt. of Chhattisgarh</td>
</tr>
<tr>
<td>5</td>
<td>Shri H.R. Kutare</td>
<td>Engineer-in-Chief (WRD)</td>
</tr>
</tbody>
</table>

STATE OF ODISHA

<table>
<thead>
<tr>
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<th>Name of the Officer</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shri Naveen Patnaik</td>
<td>Hon’ble Chief Minister</td>
</tr>
<tr>
<td>2</td>
<td>Shri Debi Prasad Mishra</td>
<td>Hon’ble Minister Industries, S&amp; ME</td>
</tr>
<tr>
<td>3</td>
<td>Shri Pushpendra Singh Deo</td>
<td>Hon’ble Minister H &amp; UD</td>
</tr>
<tr>
<td>4</td>
<td>Shri A.P. Padhi</td>
<td>Chief Secretary</td>
</tr>
<tr>
<td>5</td>
<td>Shri R Balkrishnan</td>
<td>Development Commissioner</td>
</tr>
<tr>
<td>6</td>
<td>Shri Pradeep Kumar Jena</td>
<td>Principal Secretary</td>
</tr>
<tr>
<td>7</td>
<td>Shri J B Mahapatra</td>
<td>Engineer-in-Chief (WRD)</td>
</tr>
</tbody>
</table>
MEETING TO RESOLVE THE VARIOUS WATER RESOURCES ISSUES AND PROJECTS IN MAHANADI

17th September, 2016

Mahanadi Basin

- Mahanadi river is one of the major inter-state east flowing rivers in the peninsular India.
- Total length of the river is about 851 km out of which 357 km is in Chhattisgarh and the balance 494 km in Odisha.
- It drains fairly large areas of Chhattisgarh and Odisha and comparatively small areas in the State of Jharkhand, Maharashtra and Madhya Pradesh.

<table>
<thead>
<tr>
<th>SNo</th>
<th>State</th>
<th>Drainage Area (km²)</th>
<th>% of Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chhattisgarh</td>
<td>74,970</td>
<td>52.9</td>
</tr>
<tr>
<td>2</td>
<td>Odisha</td>
<td>65,860</td>
<td>46.3</td>
</tr>
<tr>
<td>3</td>
<td>Jharkhand</td>
<td>850</td>
<td>0.6</td>
</tr>
<tr>
<td>4</td>
<td>Maharashtra</td>
<td>260</td>
<td>0.2</td>
</tr>
<tr>
<td>5</td>
<td>Madhya Pradesh</td>
<td>130</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>1,41,600</td>
<td>100.0</td>
</tr>
</tbody>
</table>
# MAHANADI RIVER BASIN

## DISTRIBUTION OF CATCHMENT AREA

<table>
<thead>
<tr>
<th>State</th>
<th>Catchment upto Dam</th>
<th>Total catchment Area in Sq KM and % of total</th>
</tr>
</thead>
</table>

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**Observed Runoff at Three Terminal Sites of CWC U/S of Hirakud Reservoir**

![Graph showing observed runoff with annual data from 2002 to 2012](image)
THANKS
### Comparative Status of Water Resources

<table>
<thead>
<tr>
<th></th>
<th>India</th>
<th>Chhattisgarh</th>
<th>%</th>
<th>Odisha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical Area</td>
<td>32,68,090 Sq.KM.</td>
<td>1,37,900 Sq.KM.</td>
<td>4.21</td>
<td>1,55,707 Sq. Km.</td>
<td>4.76</td>
</tr>
<tr>
<td>Population (2011 census)</td>
<td>121 Crores</td>
<td>2.55 Crores</td>
<td>2.10</td>
<td>4.37 Crores</td>
<td>3.61</td>
</tr>
<tr>
<td>Surface Water</td>
<td>18,69,000 MCM</td>
<td>48,296 MCM</td>
<td>2.58</td>
<td>82,841 MCM</td>
<td>4.43</td>
</tr>
<tr>
<td>Ground Water</td>
<td>4,35,420 MCM</td>
<td>14,548 MCM</td>
<td>3.35</td>
<td>16,689 MCM</td>
<td>3.83</td>
</tr>
<tr>
<td>Irrigation potential created(%)</td>
<td>49</td>
<td>34</td>
<td>~54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Proportionately, surface water is much less in Chhattisgarh.
River Basins - Chhattisgarh

State is divided into five River Basins

Mahanadi Basin accounts for 55% area and 88% population of Chhattisgarh
Mahanadi Basin

Drainage Area of Mahanadi Basin

- 53.90%
- 45.73%
- Chhattisgarh
- Odisha

Average inflow at Hirakud Dam (MCM)

- 35,308, 87%
- 5465, 13%
- Chhattisgarh
- Odisha

Catchment Area upto Hirakud (Sq.Km.)

- 75229, 87%
- 11008, 13%
- Chhattisgarh
- Odisha

Source: Minutes of meeting dated 15.06.1973 between the states of MP and Odisha

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Mahanadi River Inflow - Inferences

Availability of Water in Mahanadi river at Basantpur G and D site of CWC
Upstream of Hirakud dam

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Flow (MCM)</th>
<th>Average Flow (MCM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971-72 to 80-81</td>
<td>25,473</td>
<td>18,905</td>
</tr>
<tr>
<td>1981-82 to 90-91</td>
<td>20,666</td>
<td>21,294</td>
</tr>
<tr>
<td>1991-92 to 00-01</td>
<td>23,975</td>
<td>23,975</td>
</tr>
<tr>
<td>2001-02 to 2010-11</td>
<td>21,294</td>
<td>21,294</td>
</tr>
<tr>
<td>2011-12 to 2014-15</td>
<td>23,975</td>
<td>23,975</td>
</tr>
</tbody>
</table>

- Ten Year average annual flow at Basantpur site upstream of Hirakud reservoir does not show any decreasing trend since year 1971-72 in spite of the projects taken up by Govt. of Chhattisgarh
- "~ 5.4 BCM Live Storage capacity of Hirakud dam can be filled three times during monsoon period as per above data"

Non-Monsoon flow at Hirakud Dam vis-à-vis
Cumulative Storage created in Chhattisgarh

Graph shows positive relationship between creation of storage in Chhattisgarh and Non monsoon flow at Hirakud

Source: Data provided by Govt. of Odisha vide letter No. 20101/WR Dated 29.08.2016

Overview of Hirakud

Scope of the Hirakud project has been modified in respect of Irrigation, Industrial and Power use without knowledge of Chhattisgarh, despite Live Capacity being reduced due to siltation

Source: Report of HSTC to Study various aspects of Water Use of Hirakud Published in August 2007 Govt. of Odisha; and data provided by Govt. of Odisha
Some facts about the projects referred to, by Government of Odisha

- The six barrages (namely 1-Samoda, 2-Sheorinarayan, 3-Basantpur, 4 Mironi, 5-Saradih, and 6-Kaila) are under construction on Mahanadi
  - These barrages will store monsoon water only. They are not diversion weirs. They have no canals.
  - Proposed irrigation area from all 6 barrages together is 3,149 hectares through pumps.
  - Each has less than 2,000 Hectares potential and hence fall under Minor Irrigation Projects
  - Storage capacity of all these barrages taken together is only 274 MCM. Total industrial use in non monsoon season will be only 552 MCM. Thus, utilisation from non monsoon flow will only be (552-274=) 288 MCM whereas average Non Monsoon flow at Hirakud is 4446 MCM.
  - The live capacity of existing Dams in Chhattisgarh is reduced by siltation by more than 5% which amounts to reduction of nearly 345 MCM. The barrages under construction on Mahanadi have a total capacity of 274 MCM which is much less than the lost storage due to siltation.
  - For industries getting water from these barrages, it is mandatory to create storage backup for 2 months in their premises, which they will be filling during monsoon

Some facts about the projects referred to, by Government of Odisha

- 1-Amamuda, 2-Salka, 3-Lachchhanpur, 4-Khongsara diversion schemes in Arpa river are minor irrigation projects, irrigating less than 2,000 hectares each
- Major Projects Kelo and Arpa Bhaisajhar have already been approved by the CWC
- Pairi Mahanadi link project and Tandula link project are at preliminary stages of survey and investigation, and the information/DPR has been provided to Odisha
Issues

Hirakud Dam

- Since inception of Hirakud Dam in the year 1957, live capacity of the dam has reduced by 995 MCM. However water use for irrigation has enhanced by 703 MCM (From 2580 to 3283 MCM)
- At the time of inception, no water for industrial use was envisaged, whereas 769 MCM water is now being used for industrial purpose and further use is being planned by the Government of Odisha.
- Government of Chhattisgarh was never been consulted on the above two changes.
- 36 villages of Chhattisgarh have been submerged in Hirakud dam but Chhattisgarh is not getting any benefit.
- Hirakud Dam project is primarily planned for flood control / management. Irrigation from this reservoir has been increased by 4% in Kharif and 39% in Rabi, total being 265920 hectares which is nearly 16% more than the original plan
- Increase in Hydro-power (270 to 348 MW) has not been shared with Chhattisgarh.

Source: Report of HELC to Study various aspects of Water Use of Hirakud Published in August 2007 Govt. of Odisha

Issues

Construction of Projects by Odisha

- Govt. of Odisha is constructing number of Major dams in Indrawati Sub basin like Telangiri dam, which will further worsen the water availability in Indravati River in Chhattisgarh.
- Upper Jonk Project is an Inter-state Project of Odisha. As per agreement of 1983, water for 2000 acres (810 Ha.) has to be provided for irrigation in Chhattisgarh, but Odisha is providing water for only 1067 acres (432 Ha).
- Govt. of Odisha has not consulted the Govt. of Chhattisgarh for many projects like Hadua Medium project, Modernisation of Sason Canal system of Hirakud, Lower Indra major project etc.
Issues for Discussion

Trans-basin diversion of water from Godawari to Mahanadi Basin:

- As per GWDT award Odisha has to ensure 45 TMC (1275 MCM) water in Indrawati River for Chhattisgarh and may use 91 TMC (2577 MCM) water for its own purpose, award also provides a clause relating to proportionate use of this water for both the states. In the years of scarcity regarding availability of water both the states should decide mutually about this volume of water for proportionate distribution.

- However in the year 2011, Chhattisgarh got only 40 TMC of water and Govt. of Odisha has never intimated Govt. of Chhattisgarh about the volume of water transferred to Mahanadi Basin in Odisha.

- A gauging site of CWC is needed at the border for estimation of water flowing to Chhattisgarh.

Way forward

Constitution of Joint Control Board:

- As per the agreement between the erstwhile undivided state of Madhya Pradesh and the State of Odisha dated 28.04.1983 between Shri Arjun Singh and Shri J.B. Patnaik, the then HCMs of respective states, a joint control board was to be constituted to resolve the issues between the two States relating to survey, investigation, execution or any other issues.

- Chhattisgarh has already consented for the same on 29th July 2016 during CS level meeting at Delhi.

- This board has not been constituted so far.

CWC gauging stations:

- CWC gauging stations are needed immediate upstream of Hirakud at the state border on Mahanadi, Kelo, and Mand to ascertain the exact flow of monsoon and non-monsoon.
Presentation on

ODISHA-CHHATTISGARH ISSUES OVER MAHANADI WATER

17TH SEPTEMBER, 2016
The Odisha has the liability to handle the entire flood from Chhattisgarh.

**Catchment Area Distribution in Total Mahanadi Basin**

- **Odisha**: 65935 Sq.Km (46.6%)
- **Chhattisgarh + MP**: 76128 Sq.Km (53.1%)
- **Maharashtra**: 322.38 Sq.Km (0.2%)
- **Jharkhand**: 146.66 Sq.Km (0.1%)
- **TOTAL**: 141529 Sq.Km.
Catchment Area Distribution in Mahanadi Basin
Up to Hirakud Reservoir

Hence Hirakud Reservoir of Odisha is fully dependent upon the release from its Chhattisgarh counter port.

Background of the presently surfaced conflict over Upper Mahanadi Basin Water Use

✓ Hirakud dam is the 1st major river valley project of post-independent India
✓ It was conceived and constructed as a National Project.
✓ The Hirakud Dam Project Report was prepared in the year 1947 and it was constructed between 1948 & 1956.
✓ and it operated as a National Project for 7 years.
✓ It was transferred to Odisha in 1963.
The total water required for irrigation and power including reservoir losses will be 2.94+0.60+8.74 = 12.28 m.a.f of which 4.10 m.a.f will be derived from storage and the balance from the normal flow of the river. The minimum run off of the Mahanadi at this point is 20.61 m.a.f.

If the full requirements of power and irrigation at Hirakud as proposed in the project are met, there will still be 8.33 m.a.f. of water available in the river in the worst year for storage and diversion at dams higher up on the main river or the tributaries.

With cheap power and water transport, many large-scale industries can be set up at Sambalpur and elsewhere and their output carried cheaply to the markets of India and abroad over the great waterway of the Mahanadi, and then over the sea.

With planned utilization of its resources, Orissa can become a great centre of industry and

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**Quantification of Commitments of Hirakud dam**

**Contemplated in 1947**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Details</th>
<th>Contemplated In DPR 1947</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Irrigation</td>
<td>3628 (including Lift 2.94 MAF)</td>
</tr>
<tr>
<td>2</td>
<td>Power</td>
<td>10785 (8.74 MAF)</td>
</tr>
<tr>
<td>3</td>
<td>Evaporation</td>
<td>740 (0.60 MAF)</td>
</tr>
<tr>
<td>4</td>
<td>Domestic</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Industries</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>15147 (12.28 MAF)</strong></td>
<td></td>
</tr>
</tbody>
</table>

The report has made a broad vision statement for industrial development.

Objective quantification with respect to the domestic and industrial allocation was not spelled in the project report. The report did not contain environmental flow requirements.

In the worst year, the project architects had made an allocation of 12.28 MAF for Hirakud, leaving 8.33 MAF for use by upstream states.
Quantification of Commitments of Hirakud dam
(Planned utilization)

- Hirakud dam was originally conceived as a flood control reservoir to mitigate the flood in the downstream delta.
- Most of the flood are due to cyclonic precipitations during August and September.
- To safeguard this, Hirakud reservoir is operated primarily for flood control between August and Mid-September.
- The storage virtually begins from 3rd week of September.

The water during this period amounting to 60% of the annual average yield cannot be assured for carry over storage.

Apart from Flood Control, the planned utilization involving the irrigation, power, domestic & Industrial needs stands at 18175 MCM.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Details</th>
<th>Planned Utilisation (MCM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Irrigation</td>
<td>5722</td>
</tr>
<tr>
<td></td>
<td>including Lift</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Power</td>
<td>10222</td>
</tr>
<tr>
<td>3</td>
<td>Evaporation</td>
<td>682</td>
</tr>
<tr>
<td>4</td>
<td>Domestic</td>
<td>134</td>
</tr>
<tr>
<td>5</td>
<td>Industries</td>
<td>1415</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>18175</td>
</tr>
</tbody>
</table>

This is excluding the environmental flow requirements, which is assessed to be about 4621 MCM.

Table-7.2: Commitments of Hirakud dam during Non-monsoon (Unit: MCM)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Details</th>
<th>Present scenario</th>
<th>Commitments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Irrigation including Lift</td>
<td>1390</td>
<td>2804</td>
</tr>
<tr>
<td>2</td>
<td>Power</td>
<td>4077</td>
<td>4077</td>
</tr>
<tr>
<td>3</td>
<td>Evaporation</td>
<td>395</td>
<td>395</td>
</tr>
<tr>
<td>4</td>
<td>Domestic</td>
<td>14</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>Industries</td>
<td>432</td>
<td>825</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>6308*</td>
<td>8179*</td>
</tr>
</tbody>
</table>

*The demands shown here are exclusive of the environmental flow requirements downstream of Hirakud Dam
State of Chhattisgarh is not apprising Odisha about its
(a) presently constructed projects,
(b) the ongoing developmental activities using Mahanadi water and
(c) about its contemplated future plan.
(d) CWC has also considered some (new/ revised) major and medium projects of State of Chhattisgarh and has not felt the necessity of consultation with Odisha.
(e) There have been instances where CWC has insisted upon the state of Chhattisgarh to share the DPRs with Odisha. Instead of obliging to this request, construction activities have been undertaken, without any statutory clearances.
### List of Projects of Chhattisgarh considered by CWC, of which Odisha has not received any DPR

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Project Name</th>
<th>Major / Medium</th>
<th>Benefits in Ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mahanadi Reservoir Project</td>
<td>Major</td>
<td>26400</td>
</tr>
<tr>
<td>2</td>
<td>Sutilaput Irrigation Project</td>
<td>Medium</td>
<td>6960</td>
</tr>
<tr>
<td>3</td>
<td>Mongra Irrigation Project</td>
<td>Medium</td>
<td>9431</td>
</tr>
<tr>
<td>4</td>
<td>Minimata (Hasdeo) Bango Multipurpose Project</td>
<td>Major</td>
<td>4,33,500/120</td>
</tr>
<tr>
<td></td>
<td>(Revised)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mahanadi Reservoir Project (Revised)</td>
<td>Major</td>
<td>26400</td>
</tr>
<tr>
<td>6</td>
<td>Minimata (Hasdeo) Bango Multipurpose Project</td>
<td>Major</td>
<td>433000</td>
</tr>
<tr>
<td></td>
<td>(Revised)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Roserteda Irrigation Project</td>
<td>Medium</td>
<td>11120</td>
</tr>
<tr>
<td>8</td>
<td>Karranalla Irrigation Project</td>
<td>New / Medium</td>
<td>4100</td>
</tr>
<tr>
<td>9</td>
<td>GhumariyaNalla Irrigation Project</td>
<td>New / Medium</td>
<td>3200</td>
</tr>
<tr>
<td>10</td>
<td>Sutiapat Irrigation Project (Revised)</td>
<td>Medium</td>
<td>6960</td>
</tr>
<tr>
<td>11</td>
<td>Khrung Tank Project-ERM</td>
<td>Major</td>
<td>56,300</td>
</tr>
<tr>
<td>12</td>
<td>Maniyari Tank Project- ERM</td>
<td>Major</td>
<td>64,271</td>
</tr>
</tbody>
</table>

### Unauthorized Construction without Obtaining Prior Statutory Clearances

The State of Chhattisgarh has also taken up construction of few projects without any Statuary clearances and without consulting the downstream Co-Basin state of Odisha. Two such Projects namely

☐ Rajiv Samoda-Nisda Major Irrigation Project Phase-II &

☐ Sukhanala Medium Irrigation Project etc.

Besides, the Arpa-Bhaisajhar Project, whose DPR has been forwarded to Odisha for appraisal, is still pending at CWC for clearance. But the construction activities of this project is ongoing, as intimated by state of Chhattisgarh.

If an upstream state pursues such project construction activities unilaterally in such unauthorized manner, what would be the fate of these Inter-State rivers and the affected downstream co-basin states?
Barrage Locations in Chhattisgarh

Note: Excludes Chichol Barrage location

NB: Kalma Barrage appears to be within acquired land of Hirakud Reservoir.

LAYOUT OF INDUSTRIAL BARRAGES OVER RIVER MAHANADI IN CHHATTISGHAR

- The industrial barrages pose the real threat to Odisha.
- When these start operating in tandem, Mahanadi will be converted to an elongated pool, with a storage potential of 827 MCM of water even during non-monsoon season.
Some Features about Industrial Barrages in Chhattisgarh causing serious concern to Hirakud

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Barrage</th>
<th>Location (Village)</th>
<th>Catchment Area (Sq.Km.)</th>
<th>Annual Allocation to Industries (Mcum)</th>
<th>Summer Allocation to Industries (Mcum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saradih</td>
<td>Saradih</td>
<td>62415</td>
<td>232.33</td>
<td>54.24</td>
</tr>
<tr>
<td>2</td>
<td>Sheorinarayan</td>
<td>Sheorinarayan</td>
<td>48050</td>
<td>52</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>Basantpur</td>
<td>Basantpur</td>
<td>57780</td>
<td>184</td>
<td>32.31</td>
</tr>
<tr>
<td>4</td>
<td>Mirouni</td>
<td>Mirouni</td>
<td>57800</td>
<td>97</td>
<td>51.68</td>
</tr>
<tr>
<td>5</td>
<td>Kalma</td>
<td>Kalma</td>
<td>66835</td>
<td>474.33</td>
<td>50.14</td>
</tr>
<tr>
<td>6</td>
<td>Samoda</td>
<td>Samoda</td>
<td>10650</td>
<td>36</td>
<td>Not Known</td>
</tr>
</tbody>
</table>

The impact of these barrages are:

- Drastic reduction of non-monsoon flow in a normal year to the tune of 1074 MCM
- These barrages can arrest even the base flow during weak monsoon years

Facts to ponder with respect to these Industrial Barrages

- Looking at the (a) size, (b) interception of catchment area, (c) height of storage through gate provision, (d) the commitments made for different industrial units, one can infer that these are nothing but Major Projects.

- State of Chhattisgarh has conveniently allocated very less water for irrigation and categorized these projects as MI projects thereby has bypassed the scrutiny at appropriate level.

- CWC could not take cognizance of these projects in true perspective due to the minor project status (i.e., Irrigation<2000 Ha) of these barrages.

- Though MOEF covered it under its scope as per its revised 2006 guidelines, but categorized these projects under "B2" (i.e., minimal scrutiny from environment considerations) due to their minor project status and settled the appraisal process within the state level authorities.

The implication of these projects from inter-state angle could nowhere be examined in the proper perspective. The loopholes in the guidelines categorizing projects on ayacut basis needs a relook.
"It is noted that five barrages namely, Sheorinarayan, Basantpur, Meroni, Saradhi and Kalma across Mahanadi River are proposed. After deliberation, Committee decided to seek information from Engineer-In-Chief, Water Resources Department for comprehensive report on water planning justifying the minimum flow on downstream of each barrages according to CWC guidelines, impact on flora and fauna in river bed and water logging study in the command area reference to these five barrages proposed across the Mahanadi River."

"The committee perused the information submitted by the project proponent and is of the opinion that no comprehensive report consisting of integrated water availability study of 05 barrage projects across River Mahanadi in district Janjgir-Champa has been produced. Hence, the report submitted by the project proponent is not satisfactory."

"Committee also decided that since documents submitted by the project proponent vide letter dated 14/06/2013 reveals that construction works of the project has already been started which is violation of the provision of EIA Notification, 2006 therefore legal action against the project proponent should be initiated under the provision of Environment (Protection) Act 1986."

---

Being Minor Irrigation Project, committee decided to consider the project as category "B2" and recommended for grant of EC for Samoda barrage catchment area 10650 sq km, length of barrage 789.5 M, Height of barrage 11 M, in Mahanadi river.

---

Planned Utilization furnished by Chhattisgarh on 27.08.2016

<table>
<thead>
<tr>
<th>Demands</th>
<th>Water Use</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>10,245 MCM</td>
<td>Further utilization of 23,651 MCM for ongoing and future projects against availability of 19,237 MCM</td>
</tr>
<tr>
<td>Ongoing</td>
<td>3,643 MCM</td>
<td></td>
</tr>
<tr>
<td>Future</td>
<td>20,008 MCM</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>33,896 MCM</td>
<td></td>
</tr>
</tbody>
</table>

Fate of Hirakud

<table>
<thead>
<tr>
<th></th>
<th>Present Flow from Chhattisgarh CA</th>
<th>Total Future demand of Chhattisgarh</th>
<th>Net Flow from Chhattisgarh CA</th>
<th>Flow of Hirakud from Odisha CA</th>
<th>Total Flow of Hirakud (No flow from CG)</th>
<th>Commitments from Mahanad at Hirakud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future Scenario</td>
<td>19,237</td>
<td>23,651</td>
<td>-4,414</td>
<td>2,119</td>
<td>2,119</td>
<td>18,175</td>
</tr>
</tbody>
</table>
This extract of Indicative Master Plan of erstwhile Chhattisgarh: Page No. 59

"In addition, Orissa is already using about 10,000 Mm³ water from M.P.'s catchment contribution at Hirakud dam, over and above its own contribution. From above it will be amply clear that Orissa is using more water than its own contribution, in the Mahanadi basin."

When the philosophy of the Master Plan prepared by the upstream state stands on this extract above, a combined thinking by all present here, is the need of the hour as to Can this utter disregard to the pre-Existing Commitments of Hirakud be accepted? Should the dream project of Government of India on Inter-Linking of Rivers, especially the Mahanadi-Godavari Link, will be allowed to remain as a Myth.

Environment & Ecological Sensitivity of River Mahanadi
Elevation Zones & Mahanadi Flood Plain

Ecological Hotspots

1) Mohanadi Delta
2) Chilika Lagoon
3) Bhitarakanika Wetlands
4) Gahirmatha (Olive-Ridley turtle habitat)
5) Satkosia Wildlife Sanctuary
Mahanadi Delta

- The Mahanadi delta covers a coastline of 200 km
- The Delta covers an area of 9,500 sq km
- It is the ecological and socio-economic hub of state of Odissa
- Supports more than one-third of Odisha's population, 68% of which are farmers

Fragility of Mahanadi Delta

- The delta constitutes of flood plains and wetlands which require periodic inundations to prevent Salinity Intrusion (from sea side) and also keep it fertile with sediments/ nutrients.
- Controlled flood releases needs to be made to mimic the natural flow conditions and maintain fish migration
  - Fish migration and spawning happens only when there is a flood pulse
- Environmental flow needs to be maintained
  - To sustain aquatic bio-diversity
  - Flushing of effluents
  - Fish migration
  - Availability of safe drinking water and sanitation
Chilika Lake and Mahanadi

Chilika: A Critical Conservation Area

- Chilika Lake, the largest coastal lagoon in India and the second largest lagoon in the world, is spread over an area of over 1,100 km².
- Chilika Lake was designated the first Indian wetland of international importance under the Ramsar Convention (1981) due to its rich biodiversity:
  - The largest wintering ground for migratory birds on the Indian sub-continent. Over a million migratory waterfowl and shorebirds winter here.
  - Home to a number of Rare, Endangered & Threatened (RET) species of plants and animals. The lake is of great value in preserving genetic diversity.
  - It supports a diverse assemblage of marine, brackish and freshwater species. Over 400 vertebrate species have been recorded.
  - The lake supports fisheries that are the lifeline of the community.
  - Sustains more than 150,000 fisher-folk living in 132 villages on the shore and islands.
Chilika: Past Threats and Restoration

- In 1993, the lake was put under "The Montreux Record" as the lake was considered to have "undergone, to be undergoing, or to be likely to undergo change in its ecological character brought about by human action".

- The lake was restored by allocation of environmental flows through southern branches of the Mahanadi River. 61% of the total fresh water inflow into the lake is contributed by these branches. Other non-perennial flow-overland flows during monsoon accounts only for 39%. Any alteration to the perennial flows shall lead this unique ecosystem into extinction.

- In 2002, the Ramsar Wetland Conservation Award was presented to the Chilika Development Authority for "outstanding achievements in the field of restoration and wise use of wetlands and effective participation of local communities in these activities".

Natural Flow Duration Curve – Needs Mimicking

- **FLOODS** - High flow help rejuvenate the system. These are also important for the productivity. It helps maintain biodiversity and support ecosystem.

- **FRESHES** - Water is ecologically important because they help maintain the fish population and aquatic vegetation. Freshes help maintain the fish population and increase the release and distribution of food supplies.

- **WORKING FLOWS** - Lower flow maintains aquatic habitat and sustain species populations.

- **LOW FLOWS** - Retention of natural low flows provides refuge area and help maintain species populations and also conditions improve.
The “Surplus Water” Myth

- Taking away the so-called “surplus water” from the Mahanadi shall severely impact fish production, thereby causing a large no. of fishermen population from their livelihood. Besides there is a threat of salinity intrusion converting the fertile coastal plains into wastelands.
- In this context river Mahanadi is no different than river Ganga. If MOWR has taken a stand to stop projects in Uttarakhand (hydropower projects with non-consumptive use), why should there be a different stand for Mahanadi.
- A country should not have two different policies for Ganga and Mahanadi and like Ganga, Mahanadi should also be allowed to flow maintaining its riverine sanctity.

The Questions

- All the discussions above raises the following Questions to ponder over-

  - Whether the present, ongoing and the planned or proposed projects undertaken by the State of Chhattisgarh across river Mahanadi or its tributaries in the Mahanadi Basin would affect or likely to affect prejudicially the equitable share of about 21 MAF of water of the State of Odisha and its inhabitants in the inter-state river Mahanadi which includes the existing and committed interests?

  - Whether the minimum utilization of 12.28 MAF of Mahanadi water by the State of Odisha under the Hirakud Dam Project - planned and constructed by the Central Waterways, Irrigation and Navigation Commission (1947-36), is entitled to be fully protected on priority?

  - Whether the present, ongoing and the planned or proposed projects undertaken by the State of Chhattisgarh across river Mahanadi or its tributaries in the Mahanadi Basin would affect or likely to affect adversely the environment and ecology in the downstream part of the Mahanadi river in Odisha?

  - If answers are No, then......

  - If answers are Yes, then.........