

**ORISSA STATE WATER PLAN**

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**INTER-BASIN TRANSFER OF WATER**

## INTER-BASIN TRANSFER OF WATER

Short distance inter basin transfers is being practiced in Orissa for transfer of waters from surplus basin/sub-basin to the needy areas. The following are the existing and ongoing and proposed projects involving inter basin/sub basin transfers.

1. Mahanadi barrage to Brahmani-Baitarani-Budhabalanga Basins.
2. Samal Barrage of Brahmani Basin to Mahanadi and Baitarani basins from left and right bank canals.
3. Indravati to Mahanadi Basin through Hati Barrage.
4. Subarnarekha to Jambhira-Budhabalanga Basins through ongoing Subarnarekha multipurpose project.
5. Vansadhara - Rushikulya through Harabhangi Project

In addition to the above projects the following Inter basin transfer Projects are planned at present to meet the various requirements of needy basins/sub-basins.

1. Mahanadi (Hirakud)-Brahmani(Tikra) link Project.
2. Mahanadi (Ib)-Brahmani (Kansbahal) link Project.
3. Hirakud-Jeera-Suktel-Titalagarh link project (inter sub-basins link of Mahanadi Basin).
4. Mahanadi (Godhaneswer,Manibhadra)-Rushikulya link project.
5. Nagaballi-Vansadhara-Rushikulya link project.

### I. MAHANADI(Hirakud)-BRAHMANI(Tikra & Rengali link)

#### DESCRIPTION OF THE PRESENT PROPOSAL:

1. A Flow canal is proposed from Hirakud Reservoir near village Kilasama with a Design discharge of 230cumecs for transferring the spill waters of Hirakud to the Rengali Project in Brahmani Basin. This canal will off take with FSL of RL.185.50m A tunnel of about 6 km will be required at the Mahanadi Brahmini ridge crossing.
2. ALTRENTATIVE-I (Hirakud – Rengali Reservoir)
3. Length of this link channel is about 93.5km. After traversing this length from Hirakud the canal will out fall into Garda Nalla with FSL of 180.50m, which in turn join in Brahmani River after meeting Gohira stream. This alignment is more suitable for providing irrigation in upper reaches of Brahmini Basin.
4. This canal will traverse in 190 to 180m contours.
5. Bed level of Garda Nalla is about 143m. at the outfall of link canal. By constructing a dam across Garda Nalla with FRL of about 170m,55MW of power can be generated with a available head of 25m (keeping the tail water

level at 145m) in addition to providing irrigation for areas lying above the command ability of Rengali Project.

### ALTERNATIVE-2 (Hirakud – Samal Barrage)

The link canal after traversing a distance of 63.5 km from Hirakud joins Sankha nalla which in turn joins Tikra nala. This nallah confluences with the river Brahmini upstream of the Samal Barrage. This alignment is suitable for providing irrigation in the valley of Tikra nallah by planning two small dams/Pickup weirs across Tikra nallah besides providing irrigation to new areas not covered by the command of Rengali Project.

#### 2. MAHANADI (Ib)- BRAHMANI (KANSBAHBHAL) LINK

In order to connect Ib, a tributary to Mahanadi to Kansbahal in Brahmani basin, study has been made about the viability of the link project. It is proposed to divert the surplus waters available in Ib from the proposed Ib reservoir at FRL of 266m. through a link canal with a design discharge of 200 cumecs to Kansbahal and the to Rengali Reservoir.

#### Link Length

The total length of the link is about 72 km. The canal will off take at RL 266 m (FSL) and end in a fore bay pond of level 260m. Details of the link canal are given below:-

- i. The link will cross Rajgangpur road at RD 12.6 km.
- ii. A Barrage is proposed at RD 20.70 km for crossing Baliajore Nalla with barrage length 200m.
- iii. The link will cross Sundargarh Road at RD 29.25 km.
- iv. A barrage is proposed at RD 34.5 km for crossing Sapai Nadi with barrage length 200m.
- v. The link will cross Sundargarh road at RD 43.75 km.
- vi. The link will cross Fakrapara Nalla at RD 62 km with barrage length 200 km. An escape provision is provided for the outlet of surplus water in case of emergency which will be let out to Sankh river and finally to Brahmani.
- vii. The link will cross S.E..Railway line at RD 65 km.
- viii. Fore bay pond is proposed at RD 71.175 km.

The entire link canal is proposed with concrete linking as per is specification.

### Kansbahal Dam (Bramhani Basin)

Kansabahal irrigation project is contemplated for integrated irrigation development of Bramhani Basin. The project constructed over the stream "Badjore Nalla" a right side tributary of river Sankh, which is a main tributary of river Bramhani. The FRL and DSL of the Dam is 228M and 220.5M.

### POWER GENERATION.

The link canal is falling into a fore bay pond at RL 260M which is upstream of the Kansabahal Dam. By utilizing the fore bay pond level of 260m and FRL of Kansabahal dam of 228M power generation is possible with a head of 32M. TWL (Tail Water Level) of the power house will be 228m. Generation of 55 MW of power is feasible.

### 3. HIRAKUD-JEERA-SUKTEL-TITILAGARH LINK

The " Hirakud – Jeera-Suktel –Titilagarh link project is proposed through the following links:-

- i) Hirakud – Jeera link – length – 39 Km.
- ii) Jeera – Lower Suktyel link – length – 145.5 Km.
- iii) Lower Suktel – Titilagarh link – length – 59.25 Km.

#### i. Hirakud – Jeera Link

The DSL and FRL of Hirakud reservoir are 179.8m and 192 m respectively. While the DSL and FRL of Jeera Irrigation Project (Proposed) are 203.2 m and 212.5 m respectively. It is therefore proposed to lift of water up to RL.214 from where it may go by gravity flow upto RD 12 Km. Where there is a proposal of fore bay pond whose FRL is 214 m. From this fore bay water may flow by gravity to Jeera Irrigation Project to meet the FRL there at 212.5m. The length of proposed channel from fore bay point to Jeera will be 25 Km.

#### ii. Jeera-Lower Suktel Link.

The DSL and FRL of Jeera Irrigation Project (Proposed) are 203.2m and 212.5m respectively where as the DSL and FRL of Lower Suktel Irrigation Project are 197 m and 206 m respectively. The water in proposed channel may flow from Jeera to Lower Suktel by gravity after traveling a length of 145.50 Km. At RD 67 Km. the proposed channel will cross the river Ong. It is proposed to build a fore bay dam to lift the waters up to a height of RL 210m. From where the water can flow to Lower Suktel to meet the FRL there at 206m.

#### iii. Lower Suktel Titilagarh Link.

The DSL and FRL of Titilagarh Project is 197 m and 206 m respectively where as the DSL and, FRL of Titilagarh Project is 212 m and 216.3 m respectively. Initially it is proposed to make channel at RL.206 m for a length of 1.5 Km. From where the water may be lifted up to RL.222 m with a lift of 16 m. from that point it may go by gravity to Titilagarh after traveling a total length of 59.25 km.

#### 4. MAHANADI BASIN – RUSHIKULAY BASIN

Five nos. of proposals have been envisaged to transfer the water from Mahanadi River (downstream of Hirakud) to Rushikulya basin. In Rushikulya basin, a no. of diversion projects have been in operation since long for irrigation since diversion projects cannot store water for Rabi irrigation, it is proposed to transfer the surplus water available in Mahanadi basin to ensure assured irrigation to the area already under Khariff irrigation in Rushikulya basin.

The proposals are as given below:-

- 1) Godhaneswar barrage to Bhanjanagar Reservori.
- 2) Manibhadra Dam site to Baghua Stage-I
- 3) Manibhandra to Bont.
- 4) Manibhadra Canal near Kusumi crossing at RD 90 Km to Buda weir.
- 5) Manibhadra canal near Kusumi crossing at RD 94 Km. to Dhanei Reservoir.

##### 1. Godhaneswar Barrage to Bhanjanagar Reservoir

The pond level of the Godhaneswar barrage of Sindol Hydro-electric project is RL 100 m. so it is proposed to take a tunnel with bed level at 96 m. and connect it to Bhanjanagar Reservoir at level 86 m. the length of the tunnel is about 107 km. the slope of the tunnel will be 1:10000. From Bhanjanagar reservoir, water can be released to other system in the Rushikulya Basin to take up Rabi Irrigation. The maximum area that can be planned for future is 71.000 ha. of C.C.A. The discharge requirement will be 35 cumec.

##### 2. Manibhandra to Baghua Stage – I

The DSL of the proposed Manibhadra dam is 73.15 m. the pond level of the existing Baghua barrage is 66.30 m. so there is a head different of 6.85 m. Thus it is proposed to link Baghua Stage – I to Manibhadra at DSL to draw 35 cumec of water. The length of the tunnel will be about 75 km.

##### 3. Manibhadra to Bont Weir

The DSL of the proposed Manibhadra project is 73.15 m. the pond level of the Bont weir is 100 m. It is proposed to lift water up to RL 110 m. over a length of about 32.5 m. into a barrage over river Kuanria at latitude 20°19'30" N and longitude 84°50' E, q1 near village Narasinghapur (downstream of Kuanria Dam). Water from this location can be transported through a tunnel for a length of 36 km. to Bont weir. From Bont, water can be distributed in the Rushikulya system.

##### 4. Manibhadra Canal near Kusumi crossing at RD 90 Km. to Buda weir

The approximate level of the proposed Manibhadra canal near Kusumi river crossing at RD 90 km. from where water has been proposed to be lifted and transported to Buda weir (pond level 100 m. RL) is 59.5 m.

Water from Manibhadra canal can be lifted to a storage pond to level 105m, at longitude 20°03'10" N and latitude 85°03' E located near village Pitalgarhia. The length of the lifting conduit may be 18 km with a head of a45.50 m. From here, water can be transported into the Buda weir through a tunnel for 25.0 km. discharging 35 cumec water for use in Rushikulya system.

#### 5. Manibhadra Canal near Kusumi Crossing at RD 94 km. to Dhanei Reservoir

The approximate level of the manibhadra Canal at Kusumi River crossing from where water has been proposed to be lifted and transported to Dhanei Reservoir (DSL -83.97 m). is 59.0 m. from the Dhanei project water will be distributed in Rushikulya system.

Water from the proposed Manibhadra Canal can be lifted to a storage pond to a level 100 m at latitude 20° 03' N and Longitude 85° 04' 30' E near village Katarajhari. The length of the lifting system may be 16 Km. with a head of 31 m. from here, water can be transported into Dhanei reservoir (DSL 83.97, MWL 91.74m) through a tunnel of 35 km discharging 35 cumec to a level of 91.74m.

#### 6. NAGAVALI - BANSADHARA - RUSHIKULYA LINK PROJECT

##### PROJECT PROPOSAL

Interstate agreement between Orissa and Andhra Pradesh envisages Orissa can utilize up to 556 Mm<sup>3</sup>(20TMC) of water of Nagavali Basin. But water utilized by Orissa is only 368.34Mm<sup>3</sup>. So there is a surplus of 197.66Mm<sup>3</sup> of water in this basin, which can be utilized by Orissa.

Lower Nagavali Medium Irrigation Project envisages the construction of an earth dam of 480m long across the river Nagavali and catchment area up to dam site is 1176 Sq.Km. The project will facilitate irrigation to area of 7605ha in Khariff and 4r205 had in Rabi. The water utilization for the proposed project is 8076 Ham(2.86) TMC). A link canal is proposed to take off with a FSL if 315m with a design discharge of 32 cumecs to transfer spill waters of Lower Nagavali Project to the water deficit Rushikulya basin through Vansadhara basin. It is also proposed to transfer the surplus water available at the proposed Lower Vansadhara project of Vannsadhara basin enroute the link canal. The total length of the link canal is 115Km out of which 7km of tunnel at Nagavali-Vansadhara ridge and a tunnel of 40Km at Vansadhara-Rusikulya is required. The link canal tails off at the initial reaches of river Rushikulya upstream of the proposed Pippala Panka Project providing irrigation and to meet the other requirements of Rushikulya basin. A dam is proposed upstream of Pippala pankha project to store the transferred water through link canal and to release the waters as per the irrigation and other needs. Also power could be generated at the proposed dam site to the tune of 37MW with the available head of 120m. The total culturable area in Rushikulya basin proposed to be brought under irrigation through the waters imported from Nagavali, Vansadhara is about 30000 ha.

When all these links are established, there will be a Major link on Mahanadi lift up to Budhabalanga through Hirakud – Rengali – Anandapur Barrage (Proposed) Integrated Management of this link will ensure water availability in the entire structure. Rengali to Naraj Barrage link through Rengali Right Bank canal can supply water to Mahanadi Delta in case of storage in Hirakud. The Major tributaries on right of Mahanadi can be linked through Hirakud – Ong (Proposed) – Suktel – Titlargarh Link. This will ensure water to scarcity and drought print districts of Kalahanid and Balangir. The Southern rivers will be linked by Nagaballi – Vansadhara – Rushkulya link. This link will bring excess water of Vansadhara, Nagaballi to water deficit Rushikulya Basin.

A map showing the links in presented in Appendix -I.

## RIVER LINKING PROJECT OF GOVT. OF INDIA

The national perspective plan (NPP) formulated by NWDA, Govt. of India has two components (i) Himalayan and (ii) Peninsular component. The Himalayan component has links and the peninsular component has links. The links relevant to Orissa are the following:

1. Subarnrekha- Mahanadi Link  
(Upper Himalayan river Development)
2. Mahanadi- Godavari Link  
(Upper Peninsular River Development)

### 1. Subarnrekha - Mahanadi Link

The interlinking proposal of N.W.D.A. envisages transfer of 21.031 M.cum of surplus water of Brahmaputra to be available at Bosraghat barrage on Subarnrekha in West Bengal through Ganga-Damodar-Subarnrekha link. About 36,500 ha has been proposed for irrigation in Orissa from the above link utilizing 7066 M.cum enroute in Orissa and West Bengal.

### 2. Mahanadi – Godavari Link

This link comes under the peninsular river Development component and consists of a link with Manibhadra reservoir proposed across river Mahanadi. In this proposal 11176 M.cum of water from Manibhadra reservoir has been proposed to be transferred to Dhableswaram Barrage of Godavari. There is also proposal to transfer surplus water of Brahmaputra Basin as mentioned above. It is proposed to provide irrigation enroute in Orissa to an area of 3,52,223 ha utilizing 3307 M.cum of water. Finally 26564 M.cum of water will reach Godavari at Dhableswaram.

The Himalayan component and Peninsular component of the interlinking project are not likely to be launched together and as such receiving surplus water from Brahmaputra may not happen simultaneously. The southern linking is likely to come earlier and as such the water proposed to be transferred from Manibhadra reservoir may not be compensated by surplus water of Brahmaputra. Further transfer of water in different links proposed involves lifts in multiple stages, involving huge cost.

### Use of Government of Orissa

1. The yield of water Orissa is 85,142 M,cum including water brought to the State from other upstream states against the present consumption of 24,443,49 M,cum. It is however, estimated that the future requirement of the State by 2050 will be of the order of 55,884.50 M.cum which is just enough for the state at 75% dependability.

2. Since water will be available within the State to meet its requirement, the State will not stand to gain from the proposed link.
3. Construction of the canal through the State of Orissa which will be basically a passage for water to pass from north to south, involve large scale land acquisition and consequent displacement of persons with no appreciable benefit to the farmers of the State.
4. Water available during floods in the river Mahanadi can be carried to water deficit regions in Southern India for which the State of Orissa should get adequate compensation.

Sparing excess water-to-water deficit regions of the country may be desirable as long as the transfer is limited to the flood season. The availability of surplus water during the peak monsoon months of July and August is estimated at 30,000 M.cum, which can be spared against adequate compensation. The canal capacity should be suitable designed to carry this volume of water.