

River System & Basin Planning

River System

There are eleven major rivers flowing in the State, of which the Mahandi is the longest and the Bahuda is the shortest. The rivers of Odisha are mainly rainfed. Brief details of the rivers are given below.

(i) The Mahandi

It originates from the Amarkantak hills of the Bastar Plateau near Pharsiya village in Raipur district of Chhatisgarh. The river traverses a total distance of 851 km (in Odisha - 494 km.) and falls into the Bay of Bengal. The important tributaries of Mahandi inside Odisha are Ib, Ong, Tel, Jira, Bagh, Salki, Kuanria, Hariharjore, Sagada, Ret, Hati, Indra, Suktel, Utei, Remal, Udanti, Lanth, Sapua etc. The Major branches and sub-branches of Mahanadi are Kathajodi, Birupa, Kuakhai, Daya, Bhargavi, Kushabhadra, Biluakhai, Devi, Kandala, Chitrotpala, Luna, Karandia, Paika and Badagenguti. All the major branches and sub-branches including Mahanadi falls into Bay of Bengal except Daya & Bhargavi which fall into Chilika Lake.

(ii) The Brahmani

It is the second largest river in Odisha. Two major rivers, the Sankh and the Koel, originate from the Chhotanagpur Plateau and join at Vedavyasa near Rourkela in Sundargarh district of Odisha to form a major river called the Brahmani. It flows through Sundargarh, Keonjhar, Dhenkanal, Cuttack and Jajpur districts in the Coastal Plains and enters into the Bay of Bengal at Dhamra. The Brahmani is 799 km long. There are 45 major tributaries of the Brahmani, of which the

important ones are Sankha, Chandrinalla, Katangamundanalla, Rukura, Badjore, Kaunishnalla, Kalanalla, Usthalinalla, Chudakhainallah, Gohira, Chilanti river, Tikira, Singadajore, Bangaru river, Nandiranalla, Nigra river, Bangusinghanalla, Barha, Daunri, Kumaria, Kelua river, Birupa, Hansua, Kharsuan, Patasala in right side and Koel, Suidihi, Champalijore, Kuradihi, Amrudi, Korapani, Mankada, Ambahari, Samakoi, Gambhiria, Rajjore, Indrajeet, Ramiala, Pandra, Kharasuan, Daudi in the left side.

(iii) The Baitarani

It rises from the Gonasika in the Guptaganga hills of Keonjhar district. The river traverses a total distance of 360 kms. before falling into the Bay of Bengal. There are 64 large, medium and small tributaries, out of which 35 join on the left side and 29 join on the right side of the river. The main tributaries are Kangira, Ardei, Khairi Bhandan, Deo, Kanjhari, Sita, Musal, Kusei and Salandi River. The Salandi originates from the Meghasani hills of the Similipal in Mayurbhanja district. It flows a distance of 144 km with a catchment area of 1800 sq. km.

(iv) The Subarnarekha

It originates near Nagri village of the Chhotnagpur plateau of Jharkhand. Total length of the river from its origin to its outfall into Bay of Bengal is 446.12 km, including 79 km inside Odisha. The prominent tributaries of the Subarnarekha are Raru river, Kanchi river, Damra river, Karru river, Kharkhai river, Chinguru river, Karakari river, Gurma river, Garra river, Singaduba river, Kodia river, Dulunga river and Khaijori river.

(v) The Budhabalanga

The Budhabalanga originates from the Similipal range of hills on Mayurbhanj district and travels a total length of 198.75 km. before it finally empties into the Bay of Bengal. The prominent tributaries of the Budhabalanga are Palapala, Sunei, Kalo, Sanjo, Deo, Gangahari and Katra.

(vi) Jambhira

It originates from Chandra Reserve forest in Mayurbhanj district and travels a total length of 90 km before it finally falls in Bay of Bengal. The prominent tributaries of river Jambhira are Mahanti, Gulfa, Surudi, Murli, Saan, Bans and Hansakara.

(vii) The Rushikulya

It rises from the Rushyamala hills of the Eastern Ghats in Kandhamal district and flows in the south east direction and falls into the Bay of Bengal near Chatrapur. The prominent tributaries of the river Rushikulya are Padma, Boringanalla, Joro, Badanadi, Baghua, Dhanei and Ghodhado. It has no delta in its mouth.

(viii) The Bahuda

It rises near village Luba from the Singharaj hills of the Eastern Ghats in Gajapati district. It flows in the north east direction up to 55 km, south east direction for 17 km in Odisha before entering Andhra Pradesh to flow for 18 km. Then it turns in Northeast direction for 6 km in Odisha before meeting the Bay of Bengal near the village Sunapurapeta, Odisha. The river traverses a total length of 96 km & the prominent tributaries are Poichandia, Bogiriadi, Batrada Nalla and Kantajura Nalla.

(ix) The Vansadhara

It originates from the flanks of the Durgakangar hills (Lingaraj hills) of the Eastern Ghats in Kalahandi district. The river traverses a total distance of 239 kms before its outfall into the

Bay of Bengal in Andhra Pradesh. The prominent tributaries of river Vansadhara are Bhangi, Pedagoda on right side and Badanalla, Chauladhua, Pandaka Nalla, Badajhar, Harbhangi, Sananadi, Mahendratana on left side.

(x) The Nagabali

It originates from the Bijipur hills of the Eastern Ghats near village Lakhabahal in Kalahandi district. The total length of the river is 217 km of which 125 km. lies in Odisha and remaining portion in Andhra Pradesh. The prominent tributaries are Pitadar Nalla, Datteibannda Nallah, Sananadi, Barha Nadi, Baldiya Nadi, Sat Nallha, Sitagura Nallha, Ghora Nalla, Sitaghera Nalla, Srikona Nadi, Bonamarha Nadi, Errigeda Nallha and Jhanjhabati river.

(xi) The Indravati

It originates from the Eastern Ghats of Dandakaranya range in Kalahandi district & flows in a westerly direction; enters into Jagdalpur district in Chhatisgarh state. It further traverses in the westerly direction & thereafter in southern direction before finally meeting river Godavari at the border of Maharashtra, Chhatisgarh & Andhra Pradesh. The major tributaries of river Indravati are Keshadhara Nalla, Kandabindha Nallah, Chandragiri Nalla, Golagar Nalla, Poragarh Nalla, Kapur Nallah, Muran River, Bangiri Nallah, Telengi Nallah, Parlijori Nallah, Turi Nallah, Chourijori Nallah, Damayanti Sayarh, Kora river, Modang river, Padrikundijori river, Jaura & Bhaskel river.

(xii) The Kolab

It originates from the Sinkaran hills of the Eastern Ghats in Koraput districts and finally meets the Godavari in Andhra Pradesh. The prominent tributaries of Kolab are Karandi Nalla, Guradi Nalla, Kangar Nallah, Garia, Dharmageda Nallah, JamNadi, Malengar River, Mulervagu Nallah, Potteru Vagu Nallah, Machhakund River, Sileru River.

Basin Planning

The Need

At the early stages of development, it was generally taken for granted that our water resources were almost inexhaustible. Planning was made in a project specific manner and often for specific purpose only. The uneven distribution of water in time and space, recurrence of floods and droughts in various parts of the country coupled with increase in population and competing demands of water for variety of its use have underscored the need for a comprehensive strategic planning for integrated use of water resources. The need for such planning has been highlighted by the Irrigation Commission and Irrigation Ministers' Conference. In 1987, the first National Water Policy was formulated which summarizes the idea of River Basin Planning and Management as "Water resources development and management will have to be planned for a hydrological unit such as drainage basin as a whole or for a sub-basin, multi-sectorally, taking into account surface and ground water for sustainable use incorporating quantity and quality aspects as well as environmental considerations. All individual developmental projects and proposals should be formulated and considered within the framework of such an overall plan keeping in view the existing agreements / awards for a basin or a sub basin so that the best possible combination of options can be selected and sustained".

Planning Approach

The approach is to develop water and land resources database using modern techniques and modelling capabilities, compare and analyze total water availability in each hydrological unit with current and future requirement. When planning is perfected through stages of achievement and input, the basin catchment models comprising the State Water Plan will become a reliable and useful tool which will guide and improve the State's water and related land utilization decisions in the future.

Basin Planning in Odisha

The Basin Planning work was taken up during 1996 under OWRCP programme funded by the World Bank. The geographical area of the State is divided into 11 river basins taking into account the major river systems. The Odisha Water Planning Organisation was entrusted with the responsibility of preparing River Basin Plan. The strategies adopted for preparing River Basin Plans are indicated below:

- (i) Basin study would be conducted in four phases or spirals, out of which three spiral studies would be done for each individual basin in such a manner that the 2nd spiral study improves upon of the 1st spiral study and third spiral study improves upon the 2nd spiral study. The 4th spiral would be the consolidation of individual basin plans into an integrated State Water Plan which would be the cornerstone for future water resources development of Odisha.
- (ii) Thereafter the upgrading of the State Water Plan would be a continuous process involving new development and conservation issues as they arise.

Present Status

- (i) Third spiral studies of individual river basins have been completed.
- (ii) State Water Plan-2004 has been formulated.
- (iii) Taking into account the new development and conservation issues, emphasis has been given for preparation of basinwise IWRM plan of all basins and its implementations. The IWRM plan of Baitarani Basin has been taken up in pilot basis and the same is proposed to be extended to all basins. After completion of IWRM plan all basins, State Water Plan will be revised.
- (iv) River Basin Organisations (RBOs) in Rusikulya Basin & Baitarani Basin have been constituted.

**Table - 3.1
River System & Drainage Area**

Basin	Catchment Area		
	Total (Sq.K	Within Odisha	
		(Sq.Km.)	% to Geographical area of
Mahanadi	141134	65628	42.15
Brahmani	39116	22516	14.46
Baitarani	14218	13482	8.66
Budhabalanga & Jambhira	6691	6354	4.08
Subernarekha	19277	2983	1.92
Rushikulya	8963	8963	5.76
Indravati	41700	7400	4.75
Kolab	20427	10300	6.61
Vamsadhara	11377	8960	5.75
Nagabali	9275	4500	2.89
Bahuda	1118	890	0.57
Area draining directly to sea		3731	2.4
Total	313296	155707	100

