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A Review of Indian Major Rivers along with Maharashtra State

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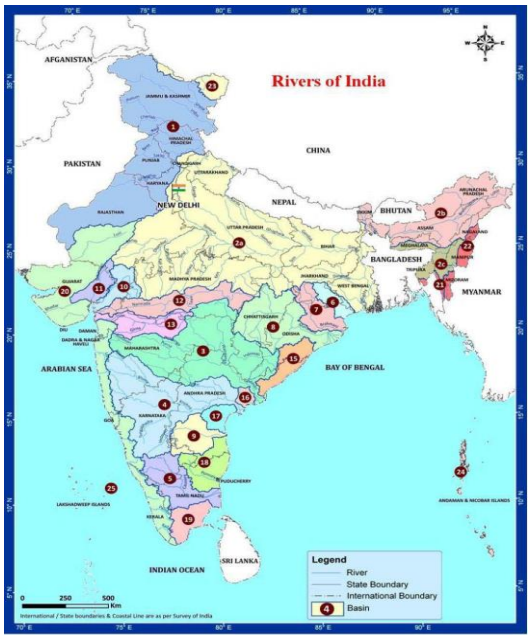
Abstract: Present article deals with A Review of Indian Major Rivers along with Maharashtra State. Rivers in India are divided into four groups- i.e. Rivers originated from Himalaya, River passes from Deccan Plateau, Rivers of coastal area and inland Rivers. About 12 major Rivers, 48 medium Rivers and more than 100 minor Rivers are found in India. The Maharashtra State having 17 main Rivers, out of which 11 are western flowing Rivers. The River networks are widely spread across every direction. However, due to interrupting the flow of River by building huge dams and reservoirs resulted in modification of natural dimensions of River as well as altering their characteristics.

Key words- Review, Major, River, Network, Minor.

1. Introduction: India receives 4000 BCM water from rainfall during monsoon months (June to September). Out of which 700 BCM is directly gone to the atmosphere while 2150 BCM dissipated to ground whereas nearly 1869 BCM poured through River towards the ocean. There are extremely huge temporal and spatial variations of rainfall during monsoon period and which have average annual rainfall of the country is about 1170 mm. (CWC, 2014).

1.1: Rivers in India: In India the Rivers are religiously significant and people prays for worship. The River networks are widely spread across every direction. About 12 major, 48 medium and more than 100 minor Rivers are found in India (WRIS, 2020). Major Rives like Ganga, Bhramaputra, Meghna etc. covered 1.10 million Km^2 land of India. This is equivalent to 43 % of River basin area. Other major Rivers i.e. Krishna, Godavari, Indus and Mahanadi etc. extend over 0.10 million Km^2 area (CWC, 2014a & b). Almost all medium and minor Rives are lies in the coastal area (Bhardwaj, 2005). The network of River in India is shown in Map 1.

Map-1: Showing network of major Rivers in India.



Source- Water Resource Information System (WRIS), 2020

Rivers in India are divided into four groups- i.e. 1) Rivers originated from Himalaya, 2) River passes from Deccan Plateau, 3) Rivers of coastal area and 4) inland Rivers. Himalayan Rivers are perennial because they receive water from melting of ice caps. Rivers originating from the Deccan plateau receive water from monsoon rainfall however during summer season water flow is reduced. Rivers like Godavari, Narmada, Tapi, Krishna are the largest Rivers originating from the Deccan plateau. Coastal Rivers originated into Western Ghats and merged into Arabian Sea. Following are the major Rivers in India discussed in detail. (Table 1)

Table No.1: Showing major Rivers in India.

S.N	River Basin	Origin	Confluence/ Merge	Catchment area Km^2	Water carrying Capacity Km^3
1	Indus River	Manas Sarovar, Tibet plateau	Zaskar River, Leh	1165000	413.3
2	Bhramaputra River	Tsangpo Tibetian plateau	Ganga River at Goalundo	712035	537.2
3	Ganga River	Gangotri Glacier, Uttarakhand	Bay of Bengal	862769	525.1
4	Barak River	Manipure hill near Lakhimpur	Ganga and Bhramaputra River	41723	483.6
5	Narmada River	Amarkantak Madhya Pradesh	Gulf of Khambat	98796	456.39
6	Tapi River	Multai Forest, Betul, Madhya Pradesh	Arabian Sea	64145	148.8
7	Godavari River	Timbakeshwar, Nashik, Maharashtra	Arabian Sea Bay of Bengal	312812	110.54
8	Krishna River	Mahabaleshwar, Maharashtra	Bay of Bengal	258948	781.2
9	Cauvery River	Talakarvi, Brahmagiri, Kodagu, Karnataka	Bay of Bengal	87900	213.58
10	Mahanadi River	Nazri Town, Madhya Pradesh	Bay of Bengal	141600	668.80
11	Mahi River	Sardarrpur village, Dhar district, Madhya Pradesh	Gulf of Bengal	34842	110.2
12	Sabarmati River	Aravali Hills, Rajasthan	Gulf of Khambat Arabian Sea	21674	38.10

Source- WRIS, 2020 (http://ecoursesonline.iasri.res.in/mod/page/view.php?id=41142)

1) Indus River: This is largest stream flows in four countries i.e. Afghanistan, Pakistan, India and China. Indus River basin covered various States i.e. Jammu & Kashmir, Punjab, Himachal Pradesh, Haryana and Rajasthan in India. Total drainage area of Indus River basin is 11, 65,000 Km^2, while in India it extends over 3, 21,289 Km^2 land. River Indus originates in Mansa Sarovar in Tibet from 5,182 meter. Length of Indus River in India is 1100 Km. Sutlej, Beas, Ravi, Chenab and Jhelum are main tributaries of the Indus River.

2) Bhramaputra River: Bharamputra name came from Lord Bhrama i.e. lord of creator. This River originated in Tibetian plateau at *Tsangpo.* This River emerges from Sang and Dihang foothills in Arunachal Pradesh in and known and

Bhramaputra. In Assam valley Lohit tributary joins this River. Total length of Bhramaputra River is 2880 Km flows in three countries India, China and Bangladesh before joining in Bay of Bangal. This River joins the Ganga River at Goalundo in Bangladesh.

3) Ganga River: Ganga is one of the sacred Rivers in India. This River originates in Gangotri glacier at Himalaya at elevation 4000 meter. Ganga River passing from the four nations i.e. India, Nepal, China and Bangladesh have a length of 2525 Km. Most of the Ganga River lies in India. River Ganga formed by the merging of two Himlayan Rivers Mandakini and Alaknanda. In India total catchment area of Ganga River is 862769 Km^2 covers almost 26.2 % of the country's area. Ganga River receives water from the tributary Rivers like Yamuna, Gomati, Ghaghara, Sone, Gandak, Burhi Gandak, Bhagirathi, Kosi and Mahananda, Betwa, Chambal, Damodar. Ganga River is famous for its mangrove ecosystem at Sunderban. River Ganga is a socially and economically important stream in India. Ganga River sustains almost 400 million people in India. The self-purification is the most significant character of this River even millions of people take daily dip as ritual and taboo in this River. This River carries thousands of dead bodies as part of funerals by Hindu culture (CWC, 2014 a & b and Priyadarshini, 2011).

4) Barak River: This River lies in India, Bangladesh and Burma. Catchment area of this River in India is 41723 Km^2 i.e. 1.38 % of total geographical area. This River originates in Manipur and further passes from Meghalaya, Mizoram, Assam, Nagaland and Tripura. In Bangladesh this River is called as Meghna and merges in the Brahmputra. Tributaries of this are Jiri, Dhaleswari, Singla, Longai, Sonai and Katakhal.

5) Narmada River: This river origin in the Deccan basalt trap at Amarkantak lies in Satpura mountain ranges. This River flows into the Maharashtra and Gujrat States. Catchment area of this River is 98,796 Km^2 and has length 1312 Km. Narmada River is the lifeline of Madhya Pradesh State and covers almost 87 % area. River Narmada merges in Arabian Sea near Bharuch in the Gujrat State. Barna, Burhner, Banjar, Hiran,Karjan, Sher, Shakkar, Dudhi,Tawa, Ganjal, Chhota Tawa, Tendoni, Uri and Orsang are tributaries of Narmada River.

6) Tapi River: Tapi River originates at Multai in Madhya Pradesh State and flows from the Madhya Pradesh, Maharashtra and Gujrat States. Total catchment area of this River is 65145 Km^2 and it has a length of 724 Km. This River is covered with hilly regions of Satpura, Satmala, Mahadeo, Ajanta and Gawilgarh. This River merges in Arabian sea near Surat in Gujrat State. Tributaries of Tapi River are Aner, Purna, Waghur, Girna, Bori, Panjhra and Burdy.

7) Godavari River: Drainage area of this River basin is 312812 Km^2 covering 9.5 % of the total land of India. Godavari and its tributaries flow in the Orissa, Maharashtra, Karnataka and Andhra Pradesh States. Godavari River originates at an elevation of 1067 meter near Trambyakeshwar town at Nashik district of Maharashtra State. Godavari River rises from Sahayadri hill ranges and then flows to plain land with undulating structures. This River irrigated 18.93 million hectares of land of this country which comprises 9.7 % area of India. Godavari River finally merges in the Bay of Bengal. Tributeries of this River are Pravara, Manjira, Maner Purna, Pranhita, Indravathi and Sabari.

8) Krishna River: Krishna River originates at an elevation of 1337 meter near Mahabaleshwar in Maharashtra State. Krishna River flows from Maharashtra, Karnataka and Andhra Pradesh States. Krishna River drainage basin area covered on 258948 Km^2 covers geographical area. Most of the River basin comprises with black soil, latrite soil and red soil. Krishna River irrigates 2.59 million hectares of aera i.e. 10.4% of cultivable land of India. Total length of Krishna River is 1400 Km and finally mixed in the Bay of Bangal. Major tributeries of Krishna River are Ghataprabha, Malaprabha, Bhima, Tungabhadra, Musi and Munneru.

9) Cauvery River: Cauvery is 4th largest east flowing River of India. This River supplies water for irrigation, industries and cities of Karnataka and Tamil Nadu State and believed that, potential is completely utilized. Catchment area of Cauvery River is 87900 Km^2. This River originates in Brahmagiri mountain ranges near Talakaveri of Karnataka State at an elevation 1841 meter. Total length of Cauvery River is 800 Km before merge in Bay of Bengal. Major tributaries of Cauvery are Harangi, Hemavathi, Arkavathi, Lakshmantirtha, Kabini and Bhavani.

10) Mahanadi River: This is the interstate peninsular River of India. Drainage area of this River extends over 141600 Km^2. This River rises at village Pharsiya in Raipur district of Madhya Pradesh. This River flows in Madhya Pradesh, Maharashtra, Orissa and Bihar. Majority part of this River lies in Madhya Pradesh and Orissa States while a very small portion in Maharashtra and Bihar States. Total length of this River is 851Km before it falls into Bay of Bengal.

11) Mahi River: This River rises at Sardarpur village in Dhar district of Madhya Pradesh State at an elevation of 500 meters. This River passes from Madhya Pradesh, Rajasthan and Gujrat States. Catchment area of this River extends over

34842 Km² and the total length of this River is 583 Km before merge to Gulf of Khmbat in Arabian Sea. Major tributaries of this River are Som, Anas and Panam.

12) Sabarmati: Sabarmati River originates at Aravali hills of Rajasthan State and passes though Ahmedabad, Kheda districts of Gujarat State. Catchemnt area of this River is about 21674 Km². Total length of this River is 300 Km before discharges into Gulf of Khambat into Arabain Sea. Major tributaries of this River are Wakal River, Sei Nadi, which rise in the Aravali hill ranges.

1.2. Rivers in Maharashtra State: - The Maharashtra is leading State in India and occupies 308 lakh hectares of land. Out of which 225 lakh hectares are cultivable area. In Maharashtra State four major Rivers Basin (Krishna, Godavari, Tapi and Narmada) have 60% population and around 92 % cultivable area. In the Maharashtra State total 17 main Rivers (Table 2), out of which 11 are western flowing Rivers.

Table No. 2: Showing major Rivers in Maharashtra State.

S. N.	River	Origin	Confluence/ Merge	Catchment area Km²	Water carrying Capacity Km³
1	Godavari River	Timbakeshwar, Nashik, Maharashtra	Bay of Bengal	312812	110.54
2	Krishna River	Mahabaleshwar, Maharashtra	Bay of Bengal	258948	781.2
3	Tapi River	Multai Forest Madhya Pradesh	Arabian Sea	64145	148.8
4	Bhima River	Bhimashankar Pune district	Krishna River at Karnataka State	70614	1.57
5	Darna River	Kalsubai Hill range	Godavari River	14789	0.64
6	Dudganga River	Sidhudurg district	Krishna River	7618	0.32
7	Indrayani River	Kurvande village near Lonavala	Bhima River	4219	0.41
8	Koyana River	Mahabaleshwar, Sangali	Krishna River	7123	0.74
9	Kukadi River	Naneghat, Pune district	Ghod River	3679	0.14
10	Mithi River	Vihar Lake, Mumbai	Arabian Sea	4519	0.31
11	Mula-Mula River	Pune	Bhima River	3010	0.37
12	Nag River	Ambazi lake Nagpur City	Kanhan River	4136	0.58
13	Nira River	Near Bhor, Pune district	Bhima River	6581	0.69
14	Panchaganga River	Chikhli village in Kolhapur district	Krishna River	5418	0.55
15	Pravara River	Bhandardara village Ahmednagar	Godavari River	6537	0.86
16	Sina River	Torna, Ahmednagar District	Bhima River	6784	0.72
17	Tanasa River	Shahapur, Thane district	Vaitarna River	4578	0.58

Source- WRIS, 2020.

1) Godavari River: The Godavari River is second largest River in India and its basin covered on 312812 Square Kilometer i.e. it occupies nearly one tenth region in India. The River Godavari originated on Trimbakeshwar a religious town in the Western Ghats at Nashik district. This River flows from Western to Eastern directions merely 80 Km from Arabian sea towards the Bay of Bengal. The River Godavari passing from the Madhya Pradesh, Karnataka, Orissa and Andhra Pradesh States. Therefore, this River is called as Southern Ganga and Vriddha Ganga.

2) Krishna River: The Krishna River Krishna is second largest River in Maharashtra State and originated at Mahabaleshwar hill station in Satara district. This River flows from Western Ghat region and 64 Km away from the Arabian sea towards eastern part of Bay of Bengal.

3) Tapi River: Tapi River originates at Multai in Madhya Pradesh State and flows from the Madhya Pradesh, Maharashtra and Gujrat States. Total catchment area of this River is 65145 Km^2 and it has a length of 724 Km. This River is covered with hilly regions of Satpura, Satmala, Mahadeo, Ajanta and Gawilgarh. This River merges in Arabian sea near Surat in Gujrat State. Tributaries of Tapi River are Aner, Purna, Waghur, Girna, Bori, Panjhra and Burdy.

4) Bhima River: The Bhima River rises from the Bhimashankar hills near Karjat in Western Ghats (Sahyadri Hills) at Bhimashankar at an altitude of about 945 meter above the sea level. The Bhima River flows in the southeast direction. In the course of the journey it meets many small Rivers. The major tributaries of this River around Pune are Kundali River, Ghod River, Bhama River, Indrayani River, Mula River, Mutha River and Pawana River. Total length of Bhima River before outfall to Krisha River is 861 Km (CWC, 2014). This River is discussed detailed in study area.

5) Darna River: The River Daran rises from the Western Ghat region of Sahydari hills near Igatpuri in Nashik district. The dam Daran built over this River near Nandgaon village. The River Danara is tributary of the Godavari River having 14789 Km^2 catchment areas. This River is non-perennial and total stretch is 35 Km.

6) Dudhganga River: It is right bank tributary of Krishna River rises at Sidhudurg district. It flows from Kolhapur district and Belgaum district before it merge to Krishna River in Karnataka State. The Kammawadi dam was constructed over this River.

7) Indrayani River: It originated from the highly rain fed area of Lonavala in Pune district. This flows from the pilgrimage places like Dehu and Alandi. Metropolitan cities like Pimpri-Chinchwad and industrial premises are located within this River basin. Anthropogenic activities alters water quality.

8) Koyana River: This is tributary of River Krishna and it originated from the Mahabaleshwar. Koyana dam built over this River and famous for hydroelectric projects. This is a big and wide River that flows slowly towards the East-West direction.

9) Kukadi River: This River originated from the high rainfall area. Yedgaon dam was built over this River. This easterly flowing River originates near Nandeghat. Dhimbhe, Manikdoh, Wadaj, Pimplegaon Jog and Yedgaon are the tributary Rivers of Kukdai River.

10) Mithi River: This is also called Mahim River. Powai and Vihar tail water discharge flows into Mithi River. Length of the River before outfall to Arabian Sea through Mahim Creek was 12 Km. Human induced development in Mumbai city around the banks of Mithi River leads to environmental degradation.

11) Mula-Mutha River: Confluence of Mula-Mutha River in Pune City originates this River. Both Mula River and Mutha River originated in hilly area Maval tehsil wererainfall is high. Drainage from Pune and Pimpri-Chainchwad cities flowing through this River toward the confluence with the Bhima River near Pargaon village in Pune district.

12) Nag River: Nag River originated from famous Ambazari lake in Nagpur city. Drainage of Nagpur city flows from this River. This River merges into the Pili River before entering the Kanhan River.

13) Nira River: This River originates near Shirwal tehsil of Satara district flows eastward. Karha River is only one tributary River of Nira River. Deodhar and Veer dam built over Nira River. This River was confluence with the Bhima River near Nira Narshingpur.

14) Panchganga River: It was a major tributary of Krishna River. It was formed due to four streams of Rivers namely Kumbhi River, Kasari River, Tulsi River and Kasari River. Panchganga River flows through the Kolhapur city and carries drains toward the Krishna River. This River has merged into Krishna River near Narsobachiwadi.

15) Pravara River: It is major tributary of Godavari River and has 208 Km length. During the course of journey Aurther lake formed due to construction of Bhandardara dam. This River flows eastward and outfalls towards Godavari River. Mahalungi, Mula and Adhula are tributaries of Pravara River.

16) Sina River: Sina is the shortest tributary River of Bhima River and 55 Km length. It is on the left bank of Bhima River origin at Ahmednagar district and flows towards Solapur district. Through the 21 Km tunnel water of Ujjani reservoir lifted into the Sina River.

17) Tanasa River: It is the smallest River i.e. 55 Km and supplies water to Mumbai city through the Tanasa Lake built in 1892. The Tanasa River is a west flowing River joining to the Vaitarana River.

However, since many centuries; human being interrupted the flow of River by building huge dams and reservoirs. This has resulted to modify natural dimensions of River as well as altering their water characteristics (De Roo et.al. 2000; Bandyopadhyay and Perveen, 2003 and 2004).

Conclusion: In review it is observed that twelve Indian major river has 4486.91 Km^3 water carrying capacity from 3802244 Km^2 catchment area. In comparison, by discounting Godavari, Tapi and Krishna river from Maharashtra State remaining 14 major river in the state has 149605 Km^2 catchment area through which these river has only 8.48 Km^3 water carrying capacity. However, human being interrupted the flow of River and modified natural dimensions as we as water carrying capacity.

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