

**A Report on “Status of  
River water quality in Karnataka over a decade  
from 2005 to 2015”**



Report prepared by

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## **Introduction**

The Rivers are a natural flowing **watercourse**, usually **freshwater**, flowing towards a lake or joins other River and ultimately joints Ocean or **sea**.

Karnataka State Pollution Control Board has established a network of riverwater quality monitoring system comprising **60 number of stations at different places of Rivers in the State**. The monitoring is done on monthly basis at 19 number of different locations of the Rivers. Presently the water quality monitoring network is operated under two programmes i.e. Global Environment Monitoring System (GEMS-5 stations ) and Monitoring of Indian National Aquatic Resources System (MINARS-57 stations).

Water samples are being analysed for 28 numbers of parameter as follows:

9 numbers of core parameters, 19 numbers of physico-chemical and Bacteriological parameters apart from the field observations. Besides this, 8 numbers of trace metals and 15 numbers of pesticides are also analysed once in a year to assess the Rivers water quality.



Figure: Karnataka River net work map

**River Water Quality Monitoring Stations (60)**  
**Cauvery and its tributaries (20)**

<b>River /No. of stations</b>	<b>Monitoring Station</b>
<b>1.Cauvery (8)</b>	At Napoklu Bridge
	At Kushalnagar town
	At Balamuri Kshetra
	D/S of Karekura Village
	At Ranganathitu village
	At D/S of Road Bridge at Shrirangapatna town
	Hebbala Valley neary Mandya At Bannur Bridge
	At Satyagala Bridge
<b>2.Arkavathi (2)</b>	T.G.Halli Reservoir
	At D/s of Kanakapura town
<b>3.Shimsha (2)</b>	Near Yediyur on NH-47
	At D/s of Bridge Halagur Town
<b>4. Kabini (4)</b>	At Saragur Village
	W.A point at KIADB, Nanjunagud town
	At Bathing Ghat, Nanjanagud town
	At Cause way Suttur village
<b>5. Lakshmanthirtha (2)</b>	D/S of Hunsur Town
	D/S of Kattemalavadi village
<b>6.Hemavathi (1)</b>	At D/S. of Holenarasipura Town
<b>7.Yagachi (1)</b>	Near Pumping Station, Hassan City

<b>River Water Quality Monitoring Stations (60) Krishna and its tributaries (35)</b>	
<b>8. Krishna - 7</b>	Ankali Bridge Along Chikkodi Kagwad Road
	At D/S of Ugarkhurd Barrage
	Asangi Village
	D/S. of Alamatti Dam
	At D/S of Narayanapura Dam
	At Tintini Bridge
	At D/S of Devasagar Bridge
<b>9.Ghataprabha - 2</b>	W.A. Point to Gokak Town
	At D/S of Mudhol Road Cross Bridge
<b>10.Malaprabha - 4</b>	At D/S of Khanapur Village
	W.A. Point to Hubli-Dharwad city
	At D/S of Aihole Town
	At Badami Bridge
<b>11.Bhima -4</b>	At D/S of Road Bridge Ghanapur Village
	At Ferozabad village
	Confluence of Jewagri Town Sewage Disposal Point
	At D/S of Bridge near Yadgir town
<b>12.Kagina - 2</b>	D/S of Sewage disposal Point, Shahabad town
	At Shahabad Bridge (U/S of shahaad town)
<b>13.Tunga - 1</b>	At D/S of Shivamogga city
<b>14.Bhadra - 5</b>	U/S of KIOCL , Kuduremukh
	D/S of KIOCL, Malleshwar village
	U/S of MPM,Bhadravathi town
	D/S of Bhadravathi (D/S of MPM)
	Near Hole Honnur town

**River Water Quality Monitoring Stations (60)  
Krishna and its tributaries (35) contd.**

<b>15.Tungabhadra - 10</b>	Confluence point of Tunga and Bhadra at Kudli village
	At Honnali Bridge
	At New Bridge, Kumarapatna village
	U/S of HPF old Bridge, Harihara town
	At Harihar Water supply Intake Point
	D/S of HPF, Harihara town
	At Jack Well Point, Nadhi Haralahally village
	At Haralahalli Bridge
	D/S of Gangawathi town
	At Ullanur Bridge

**West flowing Rivers of Karnataka (5)**

<b>16.Manjra - 1</b>	At D/S of Intake point to Bidar City
<b>17.Kali - 2</b>	U/S of West Coast Paper Mills, Dandeli town
	At D/S of West Coast Paper Mills, Dandeli town
<b>18.Netravathi - 1</b>	U/S of Dharmastahala at Water supply Intake point
<b>19.Kumara Dhara-1</b>	U/S Uppinagady Town Before Confluence with river Nethravathi

**List of Parameters analysed (Total 45)**

<b>PHYSICAL, CHEMICAL, BIOLOGICAL , TOXIC METALS &amp; PESTICIDES</b>		
Color	Fluoride	Chromium
Odour	Boron	Lead
Temperature	Potassium	Nickel
pH	Sodium	Iron
Electrical Conductivity	Calcium	Mercury
Dissolved Oxygen	Magnesium	Alpha-BHC
Turbidity	Carbonate	Beta-BHC
Total Dissolved Solids	Bicarbonate	Gamma-BHC
Ammonical Nitrogen	Chloride	Op-DDT
Nitrite Nitrogen	Sulphate	PP-DDT
Total Phosphate	Total Coliform	Alpha-Endosulphan
Total Kjeldhal Nitrogen	Faecal Coliform	Beta-Endosulphan
Nitrate Nitrogen	Arsenic	Aldrin
Bio chemical oxygen demand	Cadmium	Dieldrin
Chemical oxygen demand	Zinc	Bioassay and Toxicity

## **Krishna Basin**

**Location:** The Krishna basin extends over an area of 2,58,948 Sq km out of which 26.8% is in Maharashtra, 43.7% is in Karnataka and 29.5% falls in Andhra Pradesh. The basin lies between East Longitudes 73° 21' to 81° 09' and north latitudes 13° 07' to 19° 25' in the Deccan plateau. The Krishna rises in the Western Ghats at an altitude of 1337 M just north of Mahabaleshwar, about 64 KM from the Arabian Sea and flows from West to East through the States of Maharashtra, Karnataka and Andhra Pradesh then join the Bay of Bengal. The total length of the river from the sources to its outfall in to the sea is about 1,400 KM out of which 483 KM flows in Karnataka, along with its tributaries, the River drains about 708 KM through the Western Ghats. The Rivers Ghataprabha, Malaprabha, Bhima, Tungabhadra, Muneru and Musi are the principal tributaries. The Krishna Basin's predominant land use is agriculture.

## **Cauvery Basin**

**Location:** The Cauvery river originates at Talakaveri in Coorg District of Karnataka in Brahmagiri Range of hills in the Western Ghats at an elevation of 1,341 M. The total catchment area of 81,155 Sq KM out of which 34,273 Sq KM lies in Karnataka. It has several tributaries including the River Shimsha, River Hemavati, River Arkavathy, River Honnuhole, River Lakshmana Tirtha, River Kabini, River Bhavani, River Lokapavani, Noyyal River and the River Amaravati. It flows south to east through Karnataka and Tamil Nadu State and finally joins the Bay of Bengal. The Cauvery river is one of the major sources of water for an extensive irrigation system, and also for hydroelectric power station at Shivanasamudram. The river has supported irrigation for centuries and served as the life supporting to modern cities of South India. At Hogenekkal Falls Tamilnadu, it takes southern direction and joins the Mettur Reservoir, constructed in 1934. A tributary called River Bhavani joins Cauvery on the right



bank at about 45 km downstream of Mettur Reservoir, thereafter it takes eastern course and enters the plains of Tamil Nadu State.

The Cauvery river system consists of 21 principal tributaries each with catchment area exceeding 250 Sq KM. The largest tributary is the River **Shimsha**, flows completely in Karnataka, The longest tributary is the River **Hemavathi** (245 km) which is the fifth largest river in the catchment area and flows completely in Karnataka and then the river finally joins to Bay of Bengal at Tamilnadu.

### **Netravathi River**

The **Netravati River** has its origins at Bangrabalige valley, Yelaneeru Ghat in **Kudremukh** in **Chikkamagaluru district** of **Karnataka**, at an elevation of about 1000M at 75° 20' East longitude and 30° 10' North Latitude. This river flows through the famous pilgrimage place **Dharmasthala** and it is considered as one of the Holy rivers of India. It finally merges with the River **Kumaradhara** at **Uppinangadi** before joining to the **Arabian Sea**, south of **Mangalore** city. This river is the main source of water supply for Bantwal and **Mangalore** cities. The total length of the River Netravathi is 103 km from its source to the outfall. The river catchment area is about 3,657 sq km.

### **Tungabhadra River**

The Tunga and the Bhadra rise at Gangamoola, in Varaha Parvatha in the Western Ghats, at an elevation of 1198 metres. The river Tungabhadra is the largest tributary of the river Krishna, contributing an annual discharge of 14,700 million m<sup>3</sup> at its confluence point to the main river Krishna. The river **Tungabhadra** is a river in **southern India** which flows through the state of **Karnataka** during most of its course, before flowing along the border of **Karnataka** and **Andhra Pradesh**. Then ultimately joins the river **Krishna**. The river Tungabhadra is formed by the confluence of the river **Tunga** and the river

Bhadra at village Kudli near Holehonnur town, Shimogga District state of Karnataka State. The Bhadra river flows through the industrial city Bhadravathi. More than 100 tributaries, streams, creeks etc., contribute to the two rivers. The journey of the Tunga and the Bhadra is 147 KM and 171 KM respectively, till they join at Kudli village, at an elevation of about 610 metres near Holehonnur, about 15 km (9.3 mi) from Shivamogga city called as River **Tungabhadra**, and eventually merges with the River **Krishna** in the state of **Andhra Pradesh** which joins into the **Bay of Bengal**.

### **Inference on the River water Quality Monitoring**

- Monitoring of the major rivers under various programmes indicates that the major pollutants in these water bodies are mainly organic and bacterial contamination. This is mainly due to discharge of untreated domestic sewage into the rivers from cities, towns & villages located on the river banks. Secondly, the quality has a bearing on the quantity of flow which will be lean flow during the non monsoon seasons.

The water quality was monitored at a discharge of 100m from the discharge point of treated industrial effluent. The average water quality for ten years is as follows.

- A) Mysore Paper Mills treated effluent joins the river Bhadra near Bhadravathi town, Shivamogga Dist. Bhadra river water quality downstream of Bhadravathi town conforms to Class-C
- B) Harihara Poly Fibres and Grasilene Division treated combined effluent joins the river Thugabhadra near Haihar town , Haveri Dist. Tungabhadra

river water quality downstream of Harihara Poly fibres conforms to Class-C.

- C) West Coast Paper Mills Ltd treated effluent joins the river Kali near Bangur Nagar near Dandeli town, Uttara Kannada Dist. Kali river water quality, monitored quarterly indicates that at the downstream of the industry it conforms to Class-C

**The classification of designated best use of inland surface water as stipulated by CPCB is given in the table:**

**PRIMARY WATER QUALITY CRITERIA**

Designed Best Use	Class of Water	Criteria
Drinking Water Source without Conventional treatment but after disinfections	A	<ol style="list-style-type: none"> <li>1. Total Coliforms Organized MPN/100 ml shall be 50 or less</li> <li>2. pH between 6.5 to 8.5</li> <li>3. Dissolved Oxygen 6 mg/l or more</li> <li>4. Bio-Chemical Oxygen Demand 5 days at 20<sup>o</sup> C 2 mg/l or less</li> </ol>
Outdoor bathing (Organized)	B	<ol style="list-style-type: none"> <li>1. Total Coliforms Organized MPN/100 ml shall be 500 or less</li> <li>2. pH between 6.5 to 8.5</li> <li>3. Dissolved Oxygen 5 mg/l or more</li> <li>4. Bio-Chemical Oxygen Demand 5 days at 20<sup>o</sup> C 3 mg/l or less</li> </ol>
Drinking Water Source with conventional treatment followed by disinfection	C	<ol style="list-style-type: none"> <li>1. Total Coliforms Organized MPN/100 ml shall be 5000 or less</li> <li>2. pH between 6.0 to 9.0</li> <li>3. Dissolved Oxygen 4 mg/l or more</li> <li>4. Bio-Chemical Oxygen Demand 5 days at 20<sup>o</sup> C 3 mg/l or less</li> </ol>
Propagation of Wild Life, Fisheries	D	<ol style="list-style-type: none"> <li>1. pH between 6.5 to 8.5</li> <li>2. Dissolved Oxygen 4 mg/l or more</li> <li>3. Free Ammonia (as N) 1.2 mg/l or less</li> </ol>
Irrigation, Industrial cooling, Controlled Waste disposal	E	<ol style="list-style-type: none"> <li>1. pH between 6.0 to 8.5</li> <li>2. Electro Conductivity at 25<sup>o</sup> C micro Mhos/cm Max. 2250</li> <li>3. Sodium Absorption Ratio Max. 26</li> <li>4. Boron, Max. 2mg/l.</li> </ol>

## **Inference on the River water Quality Monitoring over a Decade(2005-2015)**

Water Quality of River analysis of 60 stations for 10 years average comprises as follows:

<b>River Class</b>	<b>%</b>	<b>Suitability for usage</b>
<b>A</b>	<b>2.5</b>	Drinking Water Source without Conventional treatment but after disinfections
<b>B</b>	<b>17.5</b>	Outdoor bathing (Organized)
<b>C</b>	<b>71.3</b>	Drinking Water Source with conventional treatment followed by disinfection
<b>D</b>	<b>6.1</b>	Propagation of Wild Life, Fisheries
<b>E</b>	<b>2.6</b>	Irrigation, Industrial cooling, Controlled Waste disposal

It shows that the quality of Class “A” rivers and the quality of Class “E” River are in equal proportions over 10 years average. Majority of the river quality complying to the Class “C”. It is observed that the status of River quality from 2005 to 2009 confirms between class “A” and class “C”. There was no River sampling showing the quality of to class “D” or “E”. But after the year 2009 it was observed slight degradation of water quality due to high discharge of untreated domestic effluent (due to increase of population) by the cities into the river.

The change of river quality observed from Class “C” to Class “D” and Class “E” quality. However the **“River water quality is directly related to the quantity flow in the River which is related to the seasonal flow variations”**.

The River basin wise 10 years annual average classification graphs are enclosed. The colour of the graph indicates the Class of the River. Colour Dark Green for Class “A”, light green for Class “B”, further light green for Class “C”, Orange colour for Class “D” and Red for Class “E” Category at the sampling points of the river.

#### **Polluted River Stretches & National River Conservation Plan (NRCP)**

- Certain stretches of rivers Bhadra, Tunga, Tungabhadra, Laxmantirtha, Kali, Krishna, Arkavathi and Malaprabha in Karnataka State have been designated as “Polluted River Stretches” by the Central Pollution Control Board based on the water quality of River.
- The Ministry is supplementing the efforts of the State Government in abatement of pollution in rivers under NRCP by providing assistance for works relating to sewerage and sewage treatment plants, low cost sanitation, river front development, crematoria and bathing ghats etc. The projects are implemented on a 70:30 cost sharing basis between the Central & State Governments. During the last three years, an amount of Rs. 0.96 crore has been released to Karnataka under this Plan.