eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

Water Pollution And Its Solutions In Banda City: A Geographical Study

[1]Dr. Dinesh Baboo
[1]Assistant Professor Department of Geography, Eklavya Mahavidyalaya duredi road Banda U.P.

Received: 20 Jan 2023, Accepted: 28 Jan 2023, Published with Peer Reviewed on line: 31 Jan 2023

Abstract

River pollution has been one of the main topics in the environmental issue of urban Banda, the district city of Uttar Pradesh. This study was conducted to find out the pollution situation of Ken River and the health problem of the surrounding residents. The results clearly determine that the water quality of Turag river may not be in a position to sustain the aquatic life and not suitable for using domestic purpose. This is indicated by the very low dissolved oxygen (DO) levels and other measured parameters in the river. The maximum recorded values of pH, color, turbidity, biochemical oxygen demand (BOD5), hardness, total dissolved solids (TDS), chloride (Cl-), carbon-di-oxide (CO2) and chemical oxygen demand (COD) were 7.1 mg/L, 625 ptcu, 97.2, 4.65 mg/L, 1816 mg/L, 676mg/L, 5 mg/L, 15.5, and 78 mg/L, respectively. The maximum concentration of turbidity, BOD, hardness, TDS, and COD found in the Ken River is much higher than the standard permissible limit. The study also provides evidence that local communities are suffering from a variety of health problems including skin, diarrhea, dysentery, respiratory illnesses, anemia and complications in childbirth. Yellow fever, cholera, dengue, malaria and other epidemic diseases are also available in this area. Furthermore, the people are suffering by the odor pollution and respiratory problems.

Keywords:- Ken River; Pollution; Impact, Solutions Geographical and Its Solutions In Banda City.

Introduction

Water is the most vital element among the natural resources, and is critical for the survival of all living organisms including human, food production, and economic development. Today there are many cities worldwide facing an acute shortage of water and nearly 40 percent of the world's food supply is grown under irrigation and a wide variety of industrial processes depends on water. The environment, economic growth, and developments are all highly influenced by water-its regional and seasonal availability, and the quality of surface and groundwater. The quality of water is affected by human activities and is declining due to the rise of urbanization, population growth, industrial production, climate change and other factors. The resulting water pollution is a serious threat to the well-being of both the Earth and its population. Pollution of river bodies has become a major problem that is becoming critical because of inadequacy or non-existence of surface water quality protection measures and sanitation. ponds, rivers and streams 36 Water Pollution and its Impact on the Human Health are sinks for wastes. Wastes are most often discharged into the receiving water bodies with little or no regard to their assimilative capacities. The discharge of raw sewage, garbage, as well as oil spills are threats to the diluting capabilities of the ponds and rivers in the major cities. The natural purification of polluted waters in itself is never fast, while heavily polluted water may traverse long distance in days before a significant degree of purification is achieved [1, 2]. In addition, rivers and canals are becoming increasingly polluted from industrial wastewater dumped by factories. The water pollution threatens food production and is raising both environmental and human health concerns. Banda city is surrounded by a number of rivers and canals of which Ken, Yamuna, Chandrawal, are the important ones. Because of the lack of the water resources management plan and policies, both the quality and quantity of water in these rivers have reached a very critical situation that does not allow its instant use. The rivers Ken, Yamuna and Chandrawal have been so extremely polluted that these have turned into the rivers of poison. The poisonous waters of these rivers have not only been killing all its aquatic life but also been

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

posing health hazards to the dwellers of the city. These rivers receive partially treated and untreated sewage effluent, sewage polluted surface run-off and untreated industrial effluent from nearby residential and industrial areas. Sources of pollution of the water in these rivers also include various industrial discharge, domestic waste; indiscriminate throwing of pathological and commercial wastes, etc. Because of this, water quality of these rivers is deteriorating day by day. River pollution has been one of the main topics in the environmental issue of urban Banda. The rivers surrounding the district city, including the Ken have been steadily experiencing complicated problems like pollution and encroachment that have almost suffocated these valuable lifelines of the city. The Ken River is one of the major rivers of Bundelkhand Region of central India, and flows through two states, Madhya Pradesh and Uttar Pradesh. It is a tributary of the Yamuna. The Ken river's length 427km. The pollution of the Ken River found in two points with extreme pollution especially from the Bhuragarh bridge to the Bay pas bridge in the Banda city. These two pollution points of the river homing in on the sources and causes of pollution, its effects on the surrounding environment and possible sustainable remedies.

2.OBJECTIVES OF THE STUDY:

The specific objectives of the study were as follows:
1. To show the variations in different water quality parameters along a strip of the river due to the disposal of untreated industrial waste and season change (dry and wet); and
2. To analyze the solutions of the water pollution.

3. MATERIALS AND METHODS:

3.1 Local of the Study

This study was conducted in a 1.3 km long strip of Ken River (Figure 1(a) and Figure 1(b)) which started from before Bhuragarh bridge following the river parallel to the Bay pass road. The average width of the river along this section is 15-20 meters; average depth during wet season is 4-6 meters and during dry season 2-4 meters.

3.2 Sources of Data

The sources of data are divided in to two categories. The data which were collected from the field or study area are called the primary data. Primary data were collected by the interviewing the people of study area and/or by making survey on a topic of the study. The secondary data are the data which were collected from any books, journals, previous research paper or any other document which contain the topics related to the study.

Figure. Study Area along the Ken River (a); A Closer View of the Study Area (b) In this study the primary data were the pictures, sampling data, interviews of people, field observation etc. The field observation obtains the physical condition of the study. In case of secondary data, map and information has been collected from Department of Environment (DOE), Bangladesh Water Development Board (BWDB), Bangladesh University of Engineering and Technology (BUET) and Institute of Water Modeling (IWM). Also, from the annual report of World Bank annual report of "Water quality and environment of Banda Uttar Pradesh", special report from the Department of Fisheries (D of), the Management of Aquatic ecosystem through Community Husbandry (MACH) and pollution board of Jhansi.

3.3 Data Collection Methods

The steps that have been adopted to attain the objectives of the study were as follows:
1. Primary data were obtained from field observation and this was needed to know about the existing physical and environmental condition of the study.
2. Secondary data have been collected from DOE, BWDB, BUET and IWM, special report from the D oF, MACH, the pollution board of Jhansi.

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

3. Water Samples and photographs have been collected from different locations of the Ken River and water samples tested in the Jhansi laboratory.
4. Recent surface water quality data has been collected from DOE and Environmental laboratory in Civil Engineering department of BUET as test sample.
5. Water quality and pollution loads analyzed to find out the present water quality scenario, trend of water pollution and percent of increase in pollution loading. Besides, reports, thesis, journals and expert opinions were collected from different organizations and internet.

6. Focus group discussions (FGDs) and in-depth interviews with community members to identify their perceived current and historical health problems. The second involved the gathering of secondary data and the undertaking of interviews with health workers in the area to determine whether the perceived changes to health expressed by the local population matched the health trends observed by local health professionals. To collect this data, our tool was taking "Interview with the people" of this location. The respondent persons were fisherman, boatman, teacher, local people, farmer, health workers, health professionals and tourist. Water quality data have analyzed by Microsoft Excel software. The standard participatory rural appraisal (PRA) methods followed to analyze data, collected from the local people concerning their perception. Some questionnaires designed and used to interview the people. All the data were analyzed by Microsoft Excel software.

3.4 Sample Collection

Surface water samples of the rivers were collected from four different points of the river in two seasons during the period of April 2017 to July 2017 covering dry and wet periods. Various water quality parameters were monitored and a detailed field survey has been conducted within the study area. Proper sampling procedure was followed while collecting the samples.

3.5 Sample Handling and Preservation

Appropriate sample handling and preservation is essential to ensure data quality. Factors considered are listed as:(a) clean plastic containers are typically used for inorganic samples, with glass containers used for organic analyses;(b) proper sample preservation is important if accurate and representative results are to be obtained from the sampling efforts. In general, all samples are placed on ice in the dark and (c) analyses should be initiated as soon as possible after collection to avoid sample deterioration.

3.6 Sample Depths:

Selection of sampling depth varies with the purpose of work and the parameter to be tested. In this study, the sampling depth was taken to be 15- 20 cm. This was because; the main point of focus of this study was surface water pollution. Generally, heavy metal concentration analysis needs sample from a deeper section.

3.7 Laboratory Testing and Standards:

The experiment on a selected segment of the river was carried out for four months duration. The time was chosen as such that both dry season and wet season was there. To assess the water quality, we conducted test on 13 water quality parameters. The lists of those parameters with the standards are listed below: From the analysis of data, it was observed that there is a distinct variation in water quality during dry and wet season. As the flow of water is less during dry season and water level goes down the quality of water become poor. As a result, water remains more polluted during dry season. Again, during wet season due to rainfall, the flow is more, level of water increases and the water quality becomes relatively better.

3.8 Determination of Water Quality Parameters:

Dissolved Oxygen (DO): The sample was taken in the bottle and diluted with the water. The probe of the multimeter was placed inside the bottle and the reading is taken.

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

Parameter	Standard
DO	6mg/L
Ph	6.5-8.5
Color	15ptcu
Turbidity	10NTU
BOD	0.2mg/L
Hardness	200-500mg/L
TDS	1000mg/L
C1-	0.2mg/L
CO2	-
COD	4mg/L

Table. Limiting Values of Different Water Quality Parameters

PH: The sample water is taken in small beaker then the probe of the pH meter is placed inside the water and kept for some time. The reading was shown on the pH meter but the final value took when the reading on the screen became static.

Colour: The sample water is taken on the small beaker of the spectrophotometer. The spectrophotometer is set for the color test and it is zeroed by the distilled water. Then the sample water is placed inside the spectrophotometer and reading is taken.
Turbidity: The sample water was taken in the small tube of the turbidity meter. The switched was on and then the reading was taken from the meter.

Biochemical Oxygen Demand (BOD5): The sample was taken in the bottle and diluted with the water. The probe of the multimeter was placed inside the bottle and the reading was taken and finally the bottle was placed inside the refrigerator at 200˚C of temperature for 5 days. After 5 days, the data was taken again trough the multi meter and the result was obtained. Hardness: The 50 ml of sample water was taken in the beaker which was diluted with 50 ml of distilled water. Then 1 ml starch in a packet of reagent was added with the water which was then titrated. However, the reading was taken when the color become purple.
Total Dissolved Solids (TDS): The sample water was taken in the beaker and the probe of the multimeter was placed inside the beaker for few minutes. The static result shown on the screen of the multimeter was the TDS of the water.

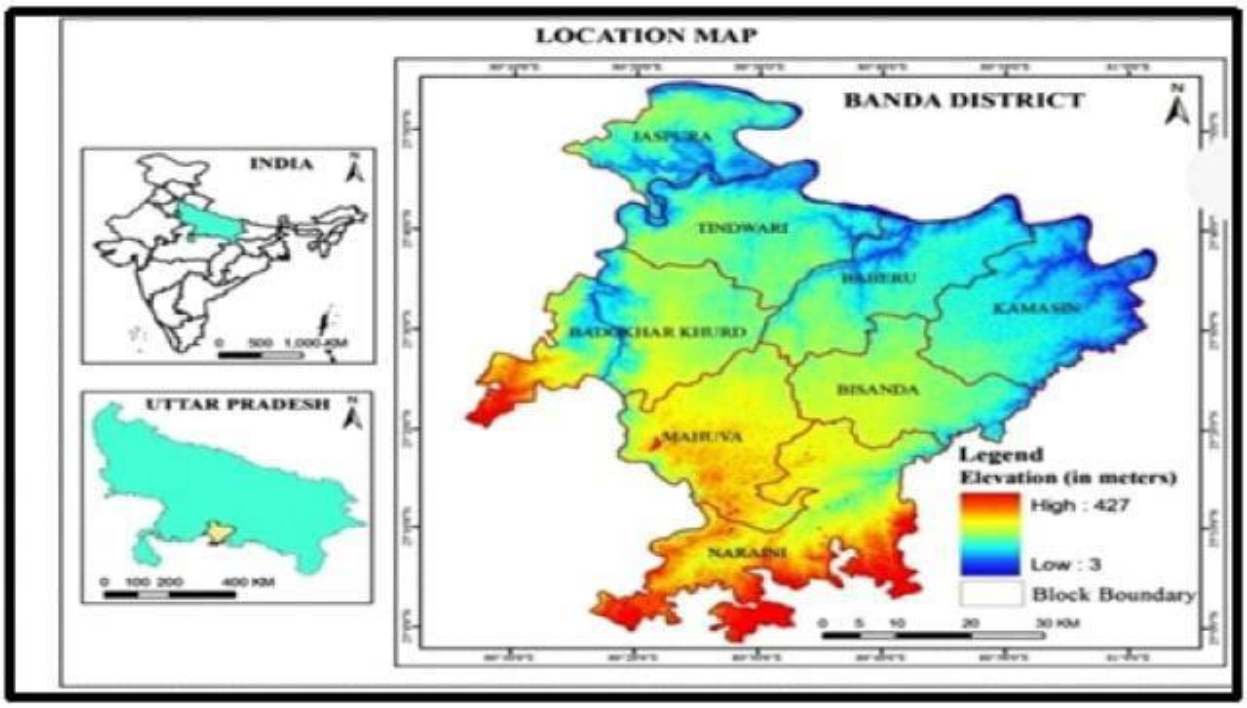
Chloride (Cl^-): Filled a square sample cell with 10 ml of sample and another one with demonized water sample pipette 1.0 ml of Mercuric Thiocyanate solution into each sample. Sample was then swirl to mix. Pipette 0.5 ml of Ferric Ion solution into each sample cell and kept the sample for two minutes. After that two cells were placed inside the spectrophotometer and the results were obtained.
Carbon-di-Oxide (CO_2): First we took 100ml of the sample, 3 drops of the Phenolphthalein was added to the sample if the sample goes pink it represents no CO_2 is present, otherwise three drops of Methyl orange was added with the sample. Later titration was done with NAOH. Five times of NAOH of titration was the amount of CO_2 present in the sample.

Chemical Oxygen Demand (COD): Turned on the reactor and pre heated to 150˚C. Hold the vial at 45-degree angle and 2 ml of sample. Then the sample was mixed by inverting the vial. The sample was heated for two hours with a strong oxidizing agent. After the vial was placed inside, the spectrophotometer and compared it with the blank vial. Thus, the result was obtained.

4.STUDY OF THE AREA:

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

Banda is a city and a municipal board in Banda district in the state of Uttar Pradesh, India. Banda lies south of the Yamuna River in the Bundelkhand region. It is the administrative headquarters of Banda District. The town is well connected to major cities with railways and state highways. The town is near the right bank of the river Ken, 95 m. S. W. of Allahabad. The Ken River, is one of the major rivers of the Bundelkhand region of central India, and flows through two states, Madhya Pradesh and Uttar Pradesh. It is a tributary of the Yamuna. The Ken River originates near village Ahirgawan on the north-west slopes of Barner Range in Katni district and travels a distance of 427 km, before merging with the Yamuna at Chilla village, district Banda in Uttar Pradesh at 25°46′N 80°31′E. Ken has an overall drainage basin of 28,058 km2, out of which 12,620 km2 belong to Sonar River its largest tributary, whose entire basin lies in Madhya Pradesh; and along its 427 kilometers (265 mi) course it receives water from its own tributaries such as Bawas, Dewar, Kaith and Bank on the left bank, and Kopra and Bearman of the right. Out of its total length of 427 kilometers (265 mi) it flows for 292 kilometers (181 mi) in Madhya Pradesh, 84 kilometers (52 mi) in Uttar Pradesh, and 51 kilometers (32 mi) forms the boundary between the two states. Crossing the Bijawar-Panna hills, the Ken River cuts a 60 km long, and 150–180 m deep gorge. Several streams join the Ken in this gorge making waterfalls. The Ken valley separates the Rewa Plateau from the Satna Plateau. IN this area have been selected Ken River found in two points with extreme pollution especially from the Bhuragarh bridge to the Baipas bridge in the Banda city. Banda is famous for its historical, mythological and religious significance.

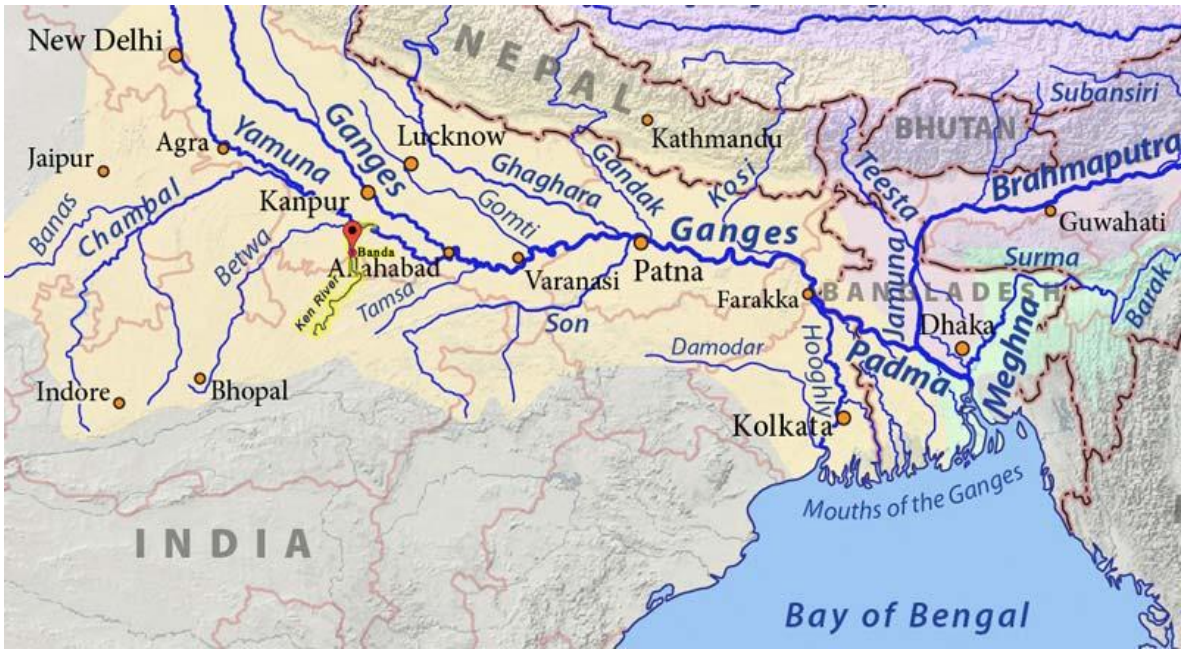


4.1 THE IMPACT OF WATER POLLUTION IN THE BANDA CITY:

On this part of study, the main target was to find out the peoples which are create by the industrial pollutant waste water discharged and flow into the river. Some people believe pollution is an inescapable result of human activity: they argue that if we want to have factories, car, and rivers, some degree of pollution is almost certain to result. In other words, pollution is a necessary evil that people must put up with if they want to make progress. Fortunately, not everyone agrees with this view. One reason people have woken up to the problem of pollution is that it brings costs of its own that undermine any economic benefits that come about by polluting. The main problem is that the people who bear the cost of the spill (typically a small coastal community) are not the people who caused the problem in the first place (the people who operate the tanker). Sewage is another good example of how pollution can affect us all. Sewage discharged into coastal waters can wash up on beaches and cause a health hazard. People who bathe or surf in the water can fall ill if they swallow polluted water—yet sewage can have other harmful

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

effects too: it can poison shellfish (such as cockles and mussels) that grow near the shore. People who eat poisoned shellfish risk suffering from an acute—and sometimes fatal—illness called paralytic shellfish poisoning. Shellfish is no longer caught along many shores because it is simply too polluted with sewage or toxic chemical wastes that have discharged from the land nearby. Pollution matters because it harms the environment on which people depend. The environment is not something distant and separate from our lives. It's not a pretty shoreline hundreds of miles from our homes or a wilderness landscape that we see only on TV. The environment is everything that surrounds us that gives us life and health. Destroying the environment ultimately reduces the quality of our own lives—and that, most selfishly, is why pollution should matter to all of us.



MOST POLLUTTED KEN RIVER IN BANDA CITY

5.

SOLUTIONS OF WATER POLLUTION IN BANDA CITY:

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

The analysis of the samples collected and the available data indicate that the DO at different locations along the river is very low, often far less than the minimum level as suggested for inland surface water. The measured DO values varied from 0.76 mg/L to7.1 mg/L where the ECR 1997 standard is 6 mg/L. Maximum DO 7.1 mg/L was recorded on 15 June 2013 from point 1 and the minimum value 0.76 mg/L was recorded on 25 April 2013 from point 3. The value of pH varied from 6.14 to 8.79 where the ECR 1997 standard is 6.5-8.5. Maximum pH 8.79 was recorded on 25 April 2017 from point 4 and the minimum pH 6.14 was recorded on 20 April 2013 from point 2. The quantity of color in the water varied from 104 patch to 625 patch where the limiting value of ECR 1997 is 15 ptcu only. Maximum value of color was recorded on 18 April 2013 from point 2 and the minimum was recorded on 31 may 2017 from point1. The value of turbidity in the water varied from 12.31 NTU to 97.2 NTU where the limiting value of ECR 1997 is 10 NTU only. Maximum value of turbidity was recorded on 18 April 2013 from point 2 and the minimum was recorded on 31 May 2013 from point 1. The BOD5 in the water varied from 0.7 mg/L to 4.65 mg/L where the limiting value of ECR in 1997 is 0.2 mg/L only. Maximum value of BOD5 was recorded on 25 April 2017 from point 3 and the minimum was recorded on 15 June 2013 from point 1. The amount of hardness in the water varied from 300 mg/L to 1816 mg/L where the limiting value of ECR 1997 is 200-500 mg/L. Maximum value of hardness was recorded on 18 April 2013 from point 2 and the minimum was recorded on 15 May 2017 from point 1. The quantity of TDS in the water varied from 118 mg/L to 676mg/L where the limiting value of ECR 1997 is 1000mg/L. Maximum value of TDS was recorded on 18 April 2017 from point 2 and the minimum was recorded on 7 June 2017 from point 1. The quantity of Cal- in the water varied from 0.24 mg/L to 5 mg/L where the limiting value of ECR 1997 is 0.2 mg/L. Maximum value of Cal- was recorded on 18 April 2017 from point 2 and the minimum was recorded on 15 June 2017 from point 4. The amount of CO2 in the water varied from 0 to 15. Maximum value of CO2 was recorded on 7 June 2017 from point 2 and the minimum was recorded on 15 June 2013 from point 4. The quantity of COD in the water varied from 4 mg/L to 78 mg/L where the limiting value of ECR 1997 is 4 mg/L. identical. At this period, pollution is so acute that hardly any hydro-organisms can tolerate it and eventually, fish of many species are found floating dead in the river water. These dead fishes gradually get rotten and highly add to the further pollution of the river water. There is no easy way to solve water pollution; if there were, it wouldn't be so much of a problem. Broadly speaking, there are three different things that can help to tackle the problem—education, laws, and economics—and they work together as a team.

5.1 EDUCATION: - Making people aware of the problem is the first step to solving it. In the early. People who've grown tired of walking the Banda's polluted Rivers (Ken, Yamuna) often band together to organize community rivers-cleaning sessions. Anglers who no longer catch so many fish have campaigned for tougher penalties against factories that pour pollution into our rivers. Greater public awareness can make a positive difference.

5.2 LAWS: - One of the biggest problems with water pollution is its transboundary nature. Environmental laws can make it tougher for people to pollute, but to be really effective they have to operate across District and States borders. They include the 1976 Bathing Water Directive, which seeks to ensure the quality of the waters that people use for recreation. Most countries also have their own water pollution laws. In the United States, for example, there is the 1972 clean water act and the 1974 safe drinking water act.

5.3 ECONOMICS- Most environmental experts agree that the best way to tackle pollution is through something called the polluter pays principle. This means that whoever causes pollution should have to pay to clean it up, one way or another. Polluter pays can operate in all kinds of ways. It could mean that factories that use rivers must have their water inlet pipes downstream of their effluent outflow pipes, so if they cause pollution, they themselves are the first people to suffer. Ultimately, the polluter pays principle is designed to deter people from polluting by making it less expensive for them to behave in an environmentally responsible way.

eISSN 2581-8996
ONLINE
THE INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MULTIDISCIPLINARY SCIENCES (IJARMS)
A BI-ANNUAL, OPEN ACCESS, PEER REVIEWED (REFEREED) JOURNAL
Vol. 6, Issue 01, Jan 2023

6. CONCLUSIONS: The results of the sampling programmed clearly determine that the water quality of Ken River may not be in a position to sustain the aquatic life as well as not suitable for using for domestic purpose. Due to lack of time and resources, the sampling programmed was limited to four months duration, from April 2017 to July 2017. The water samples were analyzed that includes DO, pH, color, turbidity, hardness, TDS, chloride, CO2, COD etc. The disposal of industrial waste effluent into revering system has given rise to heavily localized pollution and threatens seriously to the environment. The present data on the status of river water will help to establish water processing plants in future, the requirement of which increases at a tremendous rate due to growth of population, industrialization and arsenic contamination in ground water. The maximum concentration of turbidity, hardness, TDS and COD found in the Ken River is much higher than the standard permissible limit. The pollution level of the river is increasing sharply and can cause serious problem in near future. From this study, the surface water quality of the major rivers around Banda city, is a great threat to ecosystem though some parameters may not in the deteriorate level but the condition of the river side urbanization and industrialization may cause all kind of water pollution in the near future. However gastric ulcers and other similar gastric problems may be related to diet and the impacts of the pollution on crops and fish consumed by people living around Ken River. It is also possible that groundwater is being polluted by infiltration of industrial effluent but similarly there has been no empirical research into this. The problems of diarrhea and dysentery are unlikely to be caused directly by the industrial effluent, as they are usually the result of microbial contamination. However, the high level of in-migration to the area is putting considerable pressure on poor sanitation infrastructure and may be increasing the risk of contracting communicable diseases. By using of river water for washing clothing and bath many waters born disease spread man to man. However, yellow fever, cholera, dengue, malaria and other epidemic disease also available in this area. The people live in the area are also suffering by the color pollution and by the respiratory problems. For the polluted situation of the river maternal and child health of nearby riverbank slam are in a danger position.

References:

[1] P. H. McCaughey, “Engineering Management of Water Quality,” 1968.
[2] H. Peavey, D. Rowe, and G. T chobanoglous, “Environmental Engineering,” 1986.
[3] M. Abed in, “Health and Population Sector: An Overview and Vision,” in Logical Framework (Log-Frame) Workshop for the Fifth Health and Population Programmed (HAPP-5), pp. 23–25, 1997.
[4] S. Ahmed, K. Tilley, A. Clement, and M. Chadwick, “Health and Safety in the Textile Dyeing Industry,” 2005.
[5] M. Ahmed, “Sector Review Industry, Environmental Management Training Project Instructor,” 1993.
[6] M. Ahmed and M. Rah man, “Water Supply and Sanitation,” 2000.
[7] G. Browder, “Final Report of Water Quality Management Task (ADB TA1104-BAN),” National Environmental monitoring and Pollution Control Project, The Asian Development Bank, 1992.
[8] DOE, “Environmental Water Quality Standard,” 1991. http://www.doe-bd.org.
[9] Report on Water Quality of Selected Rivers in Uttar Pradesh for 1990-91and pollution trend since 1984 1992.
[10] GOB, “Environmental Conservation Rule 1997,” 1997.
[11] I. of Water Modeling (IWM), “Feasibility & Mathematical Model Study of Approaching and Investigating Strategy for Rehabilitating the Buriganga Tura Shitalakhya River system and Augmentation of Dry Season Flow in the Furigana River,” 2004.
[12] “The Environmental Pollution Control Ordinance, Ordinance no. XIII of 1977,” 1977.