Designated Best Use of Water Along Riverine Length of Ami River in U.P.

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Abstract— The main purpose of this study is to analyse the contamination in Ami River and conclude the class of river water for best designated uses. River Ami is tributary of River Rapti. Ami River is originated from Sahara Tal near Pre-Hallur (Siddhartha nagger) and joins to river Rapti. The serpentine length of Ami river is 126 kilometers and it's receives the industrial and domestic effluent during the course of 90 kilometers. The sample was collected from mid-stream of river Ami at nine locations which covers the whole river. This study carried out during the august 2015 to December 2015. The collected samples are subjected to test for physico-chemical analysis. The main reason of degradation of water quality of Ami river was due to the improper sanitation, too much anthropogenic activities, and high rate of direct discharge of effluent by industrial and domestic sectors, that is finally changed into below class—E.

Key words: Physico-chemical parameters, class of water, best designated use of water, Ami River

I. INTRODUCTION

For our life is like a life-saving drug rivers. These are main part of our nature. Today's time most our water bodies has been polluted. There important reasons are direct discharge of waste water in the river, whose industrial, domestic and anthropogenic activities are responsible. Ami River originates from sikahara tal near Pre-Hallur which is passes from Siddarth nagar , Sant Kabir nagar, Khalilabad, Maghar, Sahjanwa(Gorakhpur) and its disappears into river Rapti, which is located at Sohgaura near Kouniram. The riverine length of Ami River is 126 kilometers and its receives industrials and domestic effluent from sugar mill industries at Rudhauli, paper mill industries at Khalilabad and distilleries(IGL) and other industries effluent at GIDA (Gorakhpur) during the course of 90 kilometers which resultant, now a days this river reached at the stage of life threatening. Ami river's water has been poisonous at many places which animals are dieing day by day. The poisonous of Ami river's water, quality of underground water has been damaged, which results villagers are infected by the water borne diseases. The prime concern of this study was appraise the impact of industrial and domestic discharge on the water quality of Ami River in eastern Uttar Pradesh. The need of work is to recognize the class of water, which helps to identify the place where the severe condition of water.

II. LITERATURE REVIEW

Pramod kumar vishwakarma (2010) was studies the water quality of Ami River during Aug 2009 to Feb 2010 analyse the physico-chemical and biological characteristics of River water which obtained that Ami River polluted due to discharge of industrial effluent. Uday Bhan Prajapati and Anil K. driwedi (2011) were studies the industrial waste impact on water quality of Ami River. These are discussed physic-chemical characteristics of Ami River at five location of Ami River.

III. SIGNIFICANCE OF CLASS OF WATER

The class of water is defining the health of any water bodies. C.P.C.B. has developed a concept of best designated use. According to this, out of the several uses of water of a particular water body. There are five best designated use of water (class: A to E).

IV. STUDY AREA AND OBJECTIVES OF WORK

The study area consists of the following water quality monitoring station on River Ami.

S.No.	Location name	Details of location	
		Lattitude	Longitude
1	(S1) Pre hallur (siddharth nagar)	27.179	82.653
2	(S2) Rudhauli	26.981	82.972
3	(S3) Kore kotwa	26.931	83.053
4	(S4) Khalilabad	26.765	83.122
5	(S5) Maghar	26.708	83.152
6	(S6) Adilapar	26.713	83.219
7	(S7) Chatai bridge	26.696	83.260
8	(S8) Unwal	26.638	83.303
9	(S9) Sohgaura	26.544	83.411

V. OBJECTIVES

Ami River is the tributary river of River Rapti. Several industrial and domestic effluent are confluence with the Ami river which hazardous for the aquatic life of water bodies and also for human beings and all the exist ecosystems.
The main objectives of this study is:

1) To check water quality parameter of Ami river.
2) To evaluate the class of water on the basis of parameter which are included in this study.
3) Best designated use as per the class of water.

VI. MATERIALS AND METHODOLOGY

The surface water samples were collected in the sampling bottles from the midstream of river system at each location. The water samples were collected at an interval of one month at each location. These samples were analysed for ten physicochemical parameters as per given I.S.codes(IS-3025). The parameters are pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD). After analyse these parameters, we have to define the class of water as per designated best use for public uses and other uses.

A. Designated best use of water

Designated best use	Class of water	Criteria
Drinking water source without conventional treatment but after disinfection.	A	1) pH between 6.5 to 8.5. 2) Dissolved oxygen 6mg/l or more 3) Biochemical oxygen demand 5 days 20^0 C, 2mg/l or less 4) Total coliform organisms MPN/100 ml shall be 50 or less.
Outdoor bathing(organized)	B	1) pH between 6.5 to 8.5. 2) Dissolved oxygen 5mg/l or more 3) Biochemical oxygen demand 5 days 20^0 C, 3mg/l or less 4) Total coliform organisms MPN/100 ml shall be 500 or less.
Drinking water source after conventional treatment and disinfection.	C	1) pH between 6.5 to 9. 2) Dissolved oxygen 4mg/l or more 3) Biochemical oxygen demand 5 days 20^0 C, 3mg/l or less. 4) Total coliform organisms MPN/100 ml shall be 5000 or less.
Propagation of Wild life and Fisheries	D	1) pH between 6.5 to 8.5. 2) Dissolved oxygen 4mg/l or more 3) Biochemical oxygen demand 5 days 20^0 C, 2mg/l or less.
Irrigation, Industrial Cooling, controlled Waste disposal	E	1) pH between 6.0 to 8.5.
	Below-E	Not meeting any of the A, B,C,D & E criteria.

VII. RESULTS AND DISCUSSION

The results obtained from analysis of water sample of Ami River are shown in tables:

A. pH

pH gives the acidity or alkalinity of solution or sample. pH is analyse by pH indicator solution which gives the smoothly change in variation up to 0.5 factor. This results shows the pH of sample is appropriate. pH is max at chatai (9.0) in month of November.

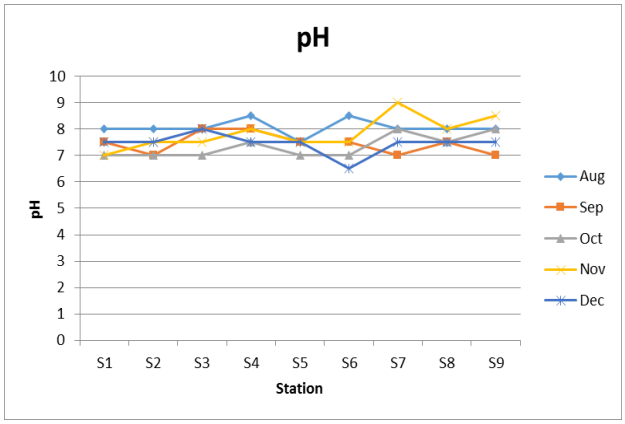

Fig. 1: pH

B. Dissolved Oxygen (mg/l)

Dissolved oxygen is max at kore kotwa (8.6) in month of December and min at adilapar (0.0) in month of November. Dissolved oxygen is important parameter of any water body system. In the respect of Ami river is too critical situation. Most of the time, it is belong to below class- E at all location except point of origin. Due to highly deterioration of dissolved oxygen in Ami River, its aquatic life has totally destroyed.

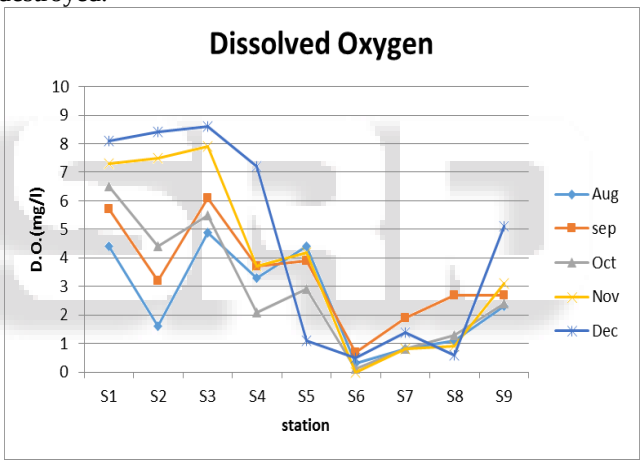

Fig. 2: Dissolved Oxygen

C. Biochemical Oxygen Demand (mg/l)

Biochemical oxygen demand data shows that at sampling station Pre Hallur, the minimum value(16.98) are obtained in month of December and at Adilapar, the maximum value(198.93) are obtained in month of August. Due to high value of BOD, its deteriorate the DO level of Ami River which can't repair until the high discharge of effluent.

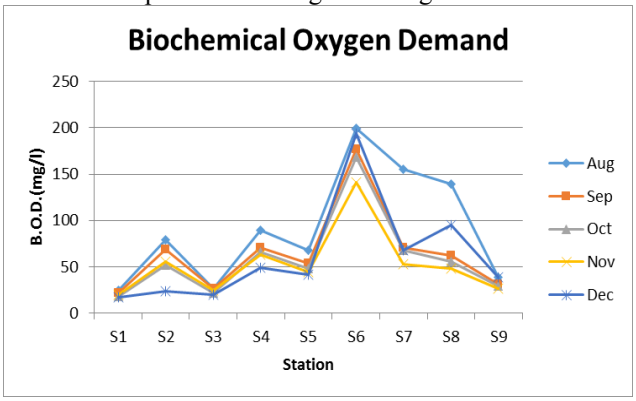

Fig. 3: Biochemical Oxygen Demand (mg/l)

D. Chemical Oxygen Demand (mg/l)

The chemical oxygen demand is min at Pre halllur (43.63) in month of Oct & Nov and max at Adilapar (633) in month of Aug. In the respect of Ami river is too critical situation. All of the time, it is belong to below class- E at all location. Due to highly increment of chemical oxygen demand in Ami River, its life has dangerous.

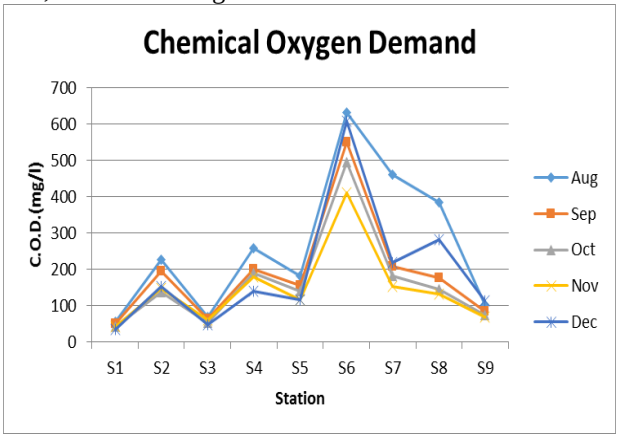

Fig. 4: Chemical Oxygen Demand (mg/l)

VIII. Discussion

The profile of pH indicates the river water is alkaline. pH is 9 at Chatai (sampling station-S7) in month of November. The profile of D.O. indicates the river water is very critical in situation. D.O. is very low in concentration from Khalilabad to Sohgaura in month of August to December and at Rudhauli is also a critical situation in context to D.O. due to heavy discharge of effluent from Bajaj Hindustan sugar mill that is located near Dhensi (Rudhauli). D.O. concentration is quite critical in situation. D.O concentration is Zero(0) at Adilapar in month of November and 0 to 0.5 throughout the Aug to Dec, due to high rate of untreated waste effluent discharge by various industrial plants (IGL-distillery) at GIDA(Gorakhpur) through the sariya nala. Due to heavy load of biological and chemical effluent its raise the B.O.D. and C.O.D. concentrations. B.O.D. is high(198.93) at Adilapar (sampling station-S6) in month of August and C.O.D. is high(633) at Adilapar in month of November. Domestic waste is also reason to increment of B.O.D. and C.O.D. values & decrement in D.O. level in Ami River. Domestic waste is discharge into Ami River By Maghar city, khajani(rural area of Gorakhpur), Baidauli(rural area of Gorakhpur). All of these profile shows the Ami river is hazardous for the aquatic life, human beings, Agricultural purpose, Bathing and Fisheries and also for its ecosystem.

IX. Conclusion

The above class shows that Ami River water is alkaline in nature. The status of dissolved oxygen in Ami River is below the critical level that is very harmful for aquatic life and also for ecosystem. The bacteriological and chemical pollution is quite high due to untreated discharge of industrial and domestic effluent. This contamination shows that high BOD and COD throughout whole Ami River. The above profile shows that Ami River water has low dissolved oxygen. Most of the time at all location of Ami River is highly polluted except point of origin. The overall class of Ami River is below-E.

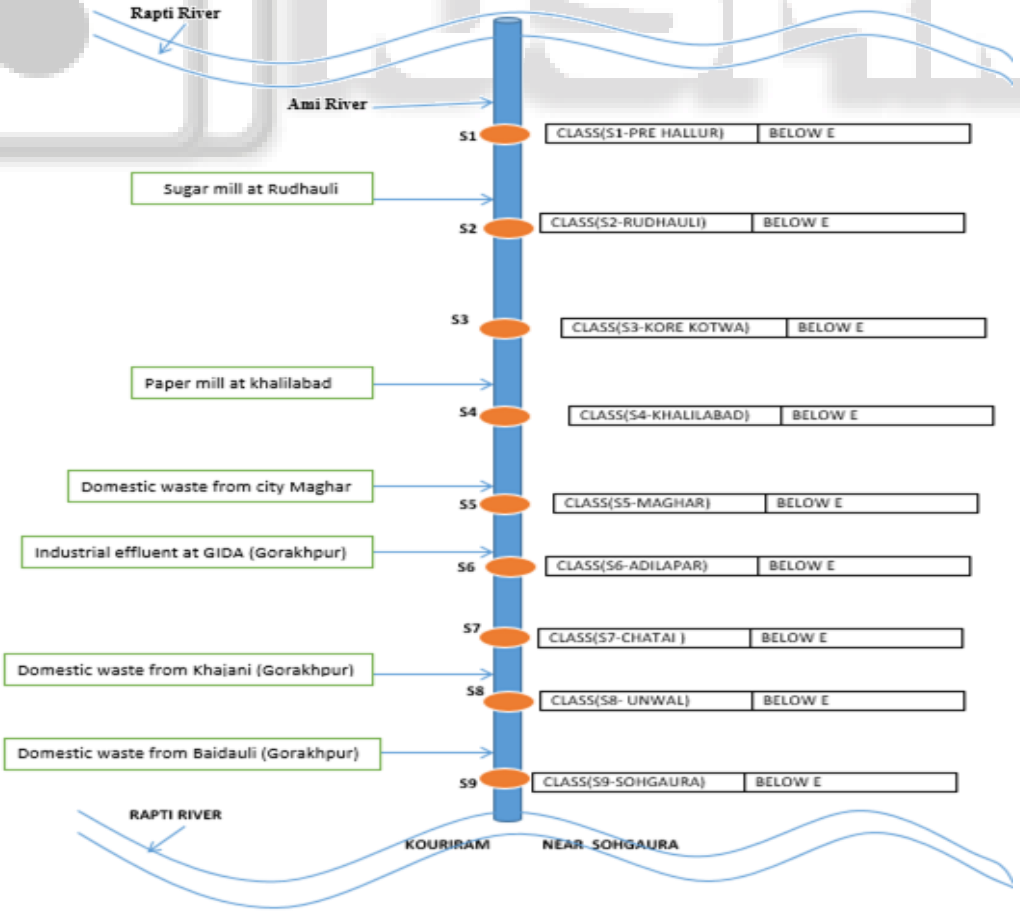

Fig. 5:

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