International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 07 | July 2019 www.irjet.net p-ISSN: 2395-0072

Analysis of Sediment Contamination of Deepor Beel, Guwahati, Assam, India

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Abstract - The aim of the study is to explain the physico chemical characteristics of sediments pollutants in Deepor Beel Lake. Lake sediment consists of biological and non biological matter accumulated since from formation of the lake. Sediment sequence in lake represents information about the activities within the Lake and in its catchment area over period of time since its inception. Deepor Beel Lake is located about 10km south west of the Guwahati city in Kamrup district of Assam. Pollutants entering the Lake undergo either absorption or adsorption by fine particles present in the Lake water which may in turn settle down in the form of sludge. The sludge is further classified into pore water and sediments. Deepor Beel is a large and internationally important natural wetland of Brahmaputra valley located in the Guwahati city. The waste from the city to this Lake has mainly degraded its water quality and hence it needs preventive study to take strong step for providing overall safety to the Lake.

Key Words– Deepor Beel, Assam, Lake Sediments, Physico Chemical Parameters, GPS, toxic substances

1. INTRODUCTION

Water is most essential commodity for human consumption and is one of the most important renewable resources, have a significant role in determining the portability of drinking water. Water is nature's most useful compound and it is the basis of all lives-ecological resources for the flora and fauna of our earth and a fundamental necessity for all lives. Without a properly functioning water supply, it is difficult to imagine productive human activity, be it agriculture or forestry, livestock, farming or fisheries and industry. Here, in this study the water quality of various parameter are carried out and the analysed the result by plotting graph concerning various scientific paper. The studies conducted on the lake reveled that there has been considerable increase of contamination level and accumulation of pollution in the Lake bed in the form of sediments posing a potential threat of contributing pollution to the surrounding ground water.

2. LITERATURE REVIEW

Baruah et al.,(1997) had performed remote sensing survey on the wetland of Deepor beel, Assam. Realizing the importance of the paramount pressure on and consequent vulnerability of extinction of the wetland, tremendous work have been done on the various ecological aspects of wetlands throughtout the world in the last few decades. Some works on wetlands in the past and recent years at national, international and regional level have been highlight here in accordance to the relevance of the present study.

3. MATERIALS AND METHODS

For sediment assessment first we visited the Deepor Beel area as initial pre field survey which was carried out for identifying the sampling stations and as a field survey 4 different placed have been selected from the surrounding of the Beel and collected samples from public Health Engineering Department (PHED) Laboratory, Guwahati for analyzing the variation of sediment pollutants in the same years but different places.

4. SAMPLING LOCATION OF DEEPOR BEEL AND DATA COLLECTED

Deepor beel wetland is located between 90036'39'' E and 91041'25''N and 26009'26''N at the south bank of river Brahmaputra . The Beel is located about 10km south west of the Guwahati city in the Kamrup district of Assam. The Beel and its adjacent villages faals under Azara revenue circle of Kamrup-metro district. The national highway 37 (NH-37) is located in the northern side of the Beel and touches its periphery at different places like Dharapur, Azara etc. Different institutions such as Guwahati University, Assam Engineering College, Assam Ayurvedic College and Forest School located in the Northern side of the wetland.

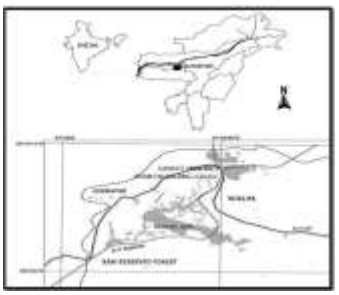

Fig:Map of study Area, Deepor Beel,Assam

Fig: View of Deepor Beel, Assam

5. SAMPLES COLLECTED MONTHLY FROM VARIOUS LOCATION OF DEEPOR BEEL

For monthly variation of sediment samples parameters collected from various location of Deepor Beel are given in the table 5.1 and 5.2.

A) January

Date	Source	Time	PH(1:5)	Lead(Pb) (mg/kg)	Zinc(Zn)(mg\kg)	Copper(Cu)(mg\kg)	Chromium(Cr)(mg\kg)	Nickel(Ni)(mg\kg)	Cadmium(Cd)(mg\kg)
28.01.2016	Sediment from mid point of Deepor Beel	11:00AM	4.8	31.0	151.5	38.3	28.9	63.7	0.7
28.01.2016	Sediment from Deepor Beel near MSW dumping site	11:45AM	5.3	24.8	115.5	115.5	21.7	29.7	0.9
28.01.2016	Sediment from Pamohi River before confluence with Deepor Beel	1:20PM	7.2	22.6	42.0	4.4	5.3	32.5	0.5
28.01.2016	Sediment from Deepor Beel near Bird watching Tower	10:30AM	5	28.0	111.0	31.6	31.6	62.8	0.9

Table 5.1: Sediment samples collected parameters in the month of March, Deepor Beel

B) June

Date	Source	Time	PH(1:5)	Lead(Pb) (mg/kg)	Zinc(Zn)(mg\kg)	Copper(Cu)(mg\kg)	Chromium(Cr)(mg\kg)	Nickel(Ni)(mg\kg)	Cadmium(Cd)(mg\kg)
28.06.2016	Sediment from mid point of Deepor Beel	10.10AM	4.6	13.3	139.5	44.9	59.4	64.9	0.7
28.06.2016	Sediment from Deepor Beel near MSW dumping site	12.15PM	4.2	17.4	138.1	45.1	54.7	64.9	0.9
28.06.2016	Sediment from Pamohi River before confluence with Deepor Beel	1.20PM	6.1	19.2	69.8	10.9	5.5	35.5	0.6
28.06.2016	Sediment from Deepor Beel near Bird watching Tower	8.00AM	5.3	16.1	138.1	32.1	54.7	47.8	0.6

Table 5.2: Sediment samples collected parameters in the month of June, Deepor Beel

6. ANALYSIS REPORT OF SEDIMENT SAMPLES COLLECTED MONTHLY FROM VARIOUS LOCATION OF DEEPOR BEEL

6.1 pH

(a) The monthly variation for pH values in the sites from near Bird Watching Tower and mid point of Deepor Beel are shown below in figure 6.1(A).

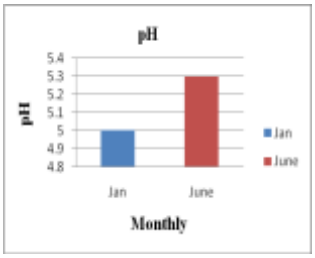

Figure 6.1(a) Sediment from Near Bird watching Tower

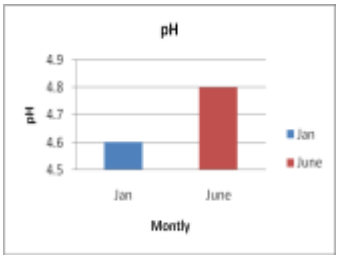

Figure 6.1(b) Sediment from Mid point of Deepor Beel

Figure 6.1 (A): pH for monthly variation

At near Bird Watching Tower, the pH values of sediment are ranged from 5-5.3 as shown in the figure 6.1(a). The highest pH value was found to be 5.3 in the month of June 2016 and the lowest pH value was found to be 5 in the month of January 2016.At midpoint, the PH values of sediment are ranged from 4.6-4.8 as shown in the figure 6.1(b). The highest pH value was found to be 4.8 in the month of June 2016 and the lowest pH value was found to be 4.6 in the month of January 2016.

b) The monthly variation for pH values in the sites MSW near Dumping site and Pamohi River before confluence with Deepor Beel.

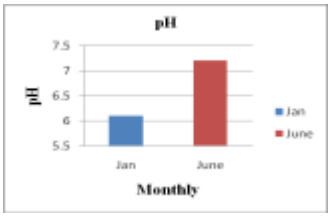

Figure 6.1(c) Sediment near MSW Dumping site

Figure 6.1(d) Sediment from Pamohi River before confluence with Deepor Beel

Figure 6.1(B): pH for monthly variation

At near MSW Dumping site, the pH value of sediment are ranged from 4.2-5.3 as shown in the figure 6.1(c). The highest pH value was found to be 5.3 in the month of June 2016 and the lowest pH value was found to be 4.2 in the month of January 2016. At Pamohi River before confluence with Deepor Beel, the pH value of sediment are ranged from 6.1-7.2 as shown in the figure 6.1(c). The highest pH value was found to be 7.2 in the month of June 2016 and the lowest pH value was found to be 6.1 in the month of January 2016.

6.2 Lead (Pb)

(a) The monthly variation for Lead values in the sites from near Bird Watching Tower and midpoint of Deepor Beel are shown below in figure 6.2(A)

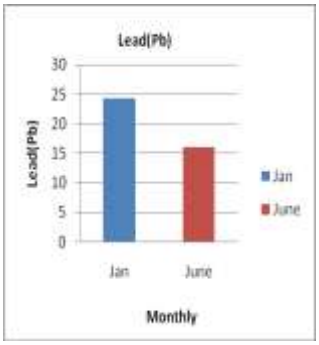

Figure 6.2(a) sediment from near view point

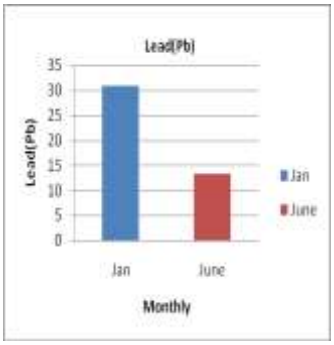

Figure 6.2 (b) sediment from mid point

Figure 6.2(A): Lead for monthly variation

At near Bird Watching Tower, the Lead (Pb) values of sediments are ranged from 24.3-16.1 as shown in figure 6.2(a). The highest Lead value was found to be 24.3 in the month of January 2016 and the lowest pH value was found to be 16.1 in the month of June 2016.At mid point the Lead (Pb) values of sediment are ranged from 31.0-13.3 as shown in the figure 6.2 (b). The highest Lead value was found to be 31.0 in the month of January 2016 and the lowest pH value was found to be 13.3 in the month of June 2016.

6.3 Copper(Cu)

(a)The monthly variation for copper values in the sites from south side of the island of Deepor Beel near Bird watching Tower and mid point of Deepor Beel as shown in the figure 6.4(A)

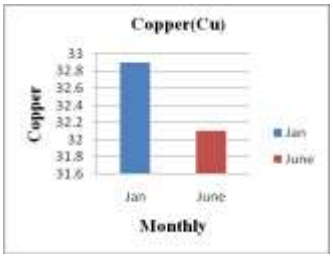

Figure 6.3(a) Sediment from near Bird Watching Tower

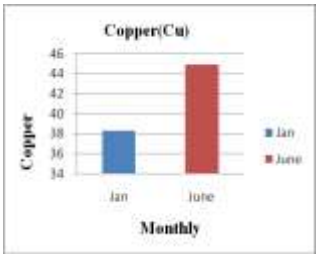

Figure 6.3(b) Sediment from mid point of Deepor Beel

Figure 6.3(A) Copper for monthly variation

At near Bird Watching Tower, the values of copper of sediment are ranged from 32.1-32.9 as shown in the figure 6.3(a). The highest copper value was found to be 32.9 in the month of January 2016 and the lowest Copper value was found to be in 32.1the month of June 2016. At mid point, the copper value of sediment is ranged from 38.3-44.9 as shown in the figure 6.3(b). The highest Copper value was found to be 44.9 in the month of June 2016 and the lowest Copper value was found to be 38.3 in the month of January 2016.

6.4 Chromium(Cr)

(a) The monthly variation for chromium values in the site near Bird Watching Tower and mid point of Deepor Beel are shown in figure 6.4(A)

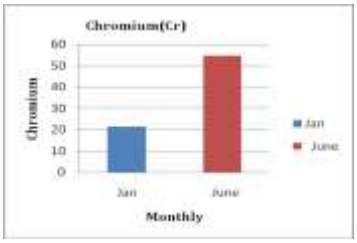

Figure 6.4(a) Sediment from near Bird Watching Tower

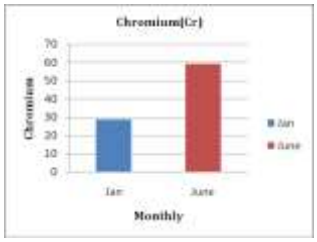

Figure 6.4(b) Sediment from mid Point of Deepor Beel

Figure 6.4(A) Chromium for monthly variation

At near Bird Watching Tower, the chromium values of sediment are ranged from 21.5-54.7 as shown in the figure 6.4(a). The highest Chromium value was found to be 54.7 in the month of June 2016 and the lowest Chromium value was found to be 21.5 in the month of January 2016. At midpoint of Deepor Beel, the chromium value of sediment are ranged from 28.9-59.4 as shown in the figure 6.4(b). The highest v Chromium value was found to be 59.4 in the month of June

2016 and the lowest pH value was found to be 28.9 in the month of January 2016.

7. CONCLUSION

The evaluation of disposal and management options needs to be based on the fullest practical consideration of the relevant risk factors as well as on technology feasibility and economic viability.

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