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The Impact of HumanAttitude andBehaviour for Their Environmental Concerns onNecessity, Suitability andFunctioning of Sewerage Treatment Plants inDelhi

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ABSTRACT
Many people have adopted environmental attitudes but their environmentally responsible behaviours have not been reflected in life in the same level. This paper emphasis upon the necessity, sustenanceand functioning of Sewerage Treatment Plants, and also draws attentions towards human attitude, behaviour and their concerns for healthy environment. The attitude and behaviour of the people living near Sewerage Treatment Plants (STP's) situated in Vasant Kunj-I, Timarpur and Okhla,in the vicinity of Delhi city were studied.The significance of the study is to get the perception of human attitude and behaviour defining their responsibilities & concerns towards the environment protection. Results obtained from the questionnaire & Statistical tools relates that there is a direct relationship between human attitude, behaviour and their concerns for environment.Results revealed the order of effectivenessof the STP's as Vasant Kunj-I >Timarpur >Okhla.It is also revealed from the study that at present there is deficit in the current environmental education among the people of Okhla so their belongingness towards environmental care is very less.
*Key Words***:**Sewerage Treatment Plants (STP's), Attitude, Behaviour, ANOVA Test.

1. INTRODUCTION

Attitude represents the positive or negative evaluation of a person, an object, group or an idea. There are different methods or measures to study attitude for example political scientists study attitude in the form of polls measuring people's evaluations of government policies or politicians. Similarly Psychologist make efforts to focus on the nature and formation of attitudes. Sociologist examine how our positions in society affect attitude formation, often emphasizing the roles of social class, race, gender and generation in how we develop and maintain attitudes about the world around us Schuman (1995). Some researchers also show that people may give you an attitude or opinion of a person or issue even when they have limited or no information about the topic (Converse and Presser 1986; Fletcher and Chalmers1991; Schuman and Presser 1980).Direct experience with specific people or objects may have as Strong or stronger an effect on attitude development than pre-existing values and beliefs (Maioet al.2003).Somehow our behaviour simply reflects our attitudes for example we clean up the environment because we care about it and engage in recreation that we enjoy. One of the reason that people study attitude is to predict their behaviour.

A number of authors have argued that humans were once psychologically and physically closer to nature than residents of industrialized nations are now (see, for example, Eliade 1964; Campbell 1983; Melson 2001; Morris 1998; Nelson 1983; and Shepard 1993, 1996). Hartig (1993) offered the transactional perspective of nature, stating that aspects of humans and the environment act in defining each other. Thus, defining whether something is natural or is unnatural requires a person to reflect on a holistic basis. Hartig maintains that dividing the person and environment into discrete elements is not the goal of this perspective. He believes that each entity acts to define the other and is thus interconnected.

Every human being wants to live in the healthy environment. Sewerage treatment plants are very beneficial to the human society and as well as for the environment as they treat the domestic sewage and make them less harmful for when dispose on land or water body. The present paper emphasis the need and sustainability of Sewerage Treatment Plants (STP's) giving an overview reflecting human Attitude, Behaviour and their Environmental Concerns.

Sewerage Treatment Plant is a facility designed to receive the waste from domestic, commercial and industrial sources and to remove materials that damage water quality and compromise public health and safety when discharged into water receiving systems. It works on the objective to allow human, domestic and industrial effluents to be disposed of without danger to human health or unacceptable damage to the natural environment
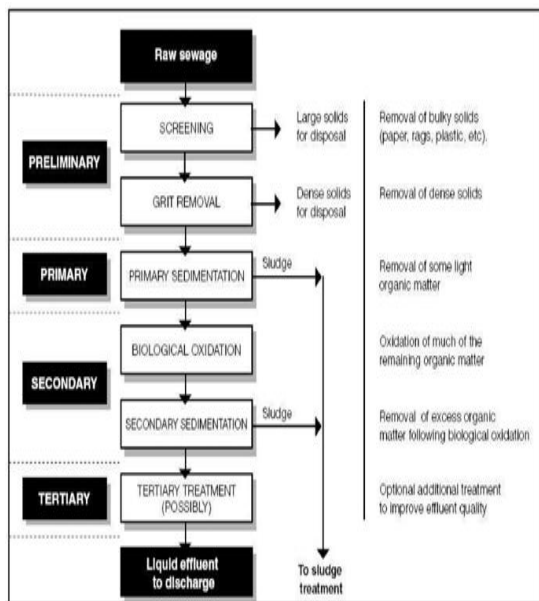
Many Researchers and authors have studied a lot regarding the technologies used for the treatment of sewage. Some of the researchers have also used the combination of the technologies for the effective treatment of the wastewater (Sewage). Priyanka Jamwal and Atul K.Mittal (2008) carried out a study on Physical, chemical and microbiological efficiencies of Sewage Treatment Plants (STPs) located in Delhi's in context of different treatment technologies employed in these plants.

`City Delhi consist of many Sewerage Treatment plants based on Extended Aeration, Oxidation pond and Activated Sludge Process technologies. For the present study we have taken Sewerage Treatment Plants working on the above mentioned technologies situated at different location in Delhi.

In the present paper main emphasis is to know the attitude and behaviour of the people residing nearby in these places were also evaluated by using questionnaire to see how much concern theyhave regarding the protection & cleanness of the environment. Statistical tools are applied to see the effect of human attitude and behaviour on the Functioning, performance and efficiency of the respective Sewerage Treatment Plants.

2. MATERIALS & METHODOLOGY
2.1 Study Area and Methodology:

Table 2.1.1: Areas under study

S.No.	Locations	Codes Given
1	Vasant Kunj-I	S1
2	Timarpur	S2
3	Okhla	S3

Vasant Kunj-I: Sewerage Treatment Plant of 5 MGD is situated in Sector B, Vasant Kunj, New Delhi. This STP is using Extended Aeration technology for the treatment of Sewage.

Timarpur: Sewerage Treatment Plant of 6 MGD is situated Timarpur, New Delhi. Oxidation Ditch is the technology used in this plant for the treatment of Sewage.

Okhla: Sewerage Treatment Plants having total capacity of 170 MGD are situated in various phases(I, II, III, and IV) of Industrial area, Okhla, New Delhi. Activated Sludge Blanket (ASP) is the technology mainly used in these plants for the treatment of Sewage.

2.2.Study Instrument: The self-administered questionnaire was used for data collection. The questions developed for the questionnaires took into consideration the behaviour and attitude of the locals towards environmental concerns of their area and hence the STP's. The questionnaire consisted of several component, namely (i) Demographic background; (ii) Attitude (iii) Behavioural aspect of environmental concerns. There were 10 statements each in attitude and behavioural domain to assess the respondent's attitude and behaviour towards the sewerage treatment plant/ environmental concerns of their area. Respondents are given choice of strongly agree, moderately agree, no idea, not bothered, moderately disagree and strongly disagree for each statement.

2.3.Field Survey: During the beginning of data collection session, respondents were briefed on the questionnaire in detail. Besides that, written instructions on how to fill and complete the questionnaire were also included in the questionnaire. Respondents were given assurance of the confidentiality of the information given. They were also requested to withhold their identity by not writing their name on the questionnaire.

2.4. Data Analysis: Data were analysed using Excel 2010. Descriptive statistics was used to describe the characteristic of sample and proportion of answers by respondents for each statement of the questionnaire.To analyse the difference in attitude and behaviour of the people living in three areas of study one way ANOVA is applied

3. RESULTS & DISCUSSIONS

Distribution of responses for statements pertaining to respondents' attitude towards STP is shown in Table 3.1.

Table3.1: Level of respondents' attitude towards their STP

Items	Strongly Agree			Moderately Agree			No Idea			Not Bothered			Moderately Disagree			Strongly Agree		
	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)
1	78	53	31	12	11	12	2	4	9	2	10	16	3	13	23	3	9	9
2	43	31	10	21	10	7	1	20	21	3	12	13	17	13	20	15	14	29
3	7	14	41	5	11	31	7	3	2	2	3	11	62	38	7	17	31	8
4	91	79	51	4	0	10	1	4	14	2	8	18	0	4	0	2	5	7
5	21	17	43	11	28	11	0	0	0	4	0	29	57	51	17	7	4	0
6	43	26	12	41	19	13	10	16	31	6	13	34	0	14	4	0	12	6
7	98	80	69	2	7	13	0	10	3	0	3	6	0	0	4	0	0	5
8	89	59	47	4	25	29	7	6	15	0	5	0	0	2	3	0	3	6
9	29	15	4	26	14	6	14	13	40	8	12	15	5	24	17	18	22	18
10	54	34	18	32	16	21	0	13	14	3	0	0	5	19	25	6	18	22

Table 3.1 shows that the attitude of the people living in Vasant Kunj I(S1 site) is overall good except for the statements which states that we care whether STP is working properly or not (21%) & we stop people from throwing things in the STP (16%).

According to the data in Table 3.1, 77% of the respondents thinks that the STP plant nearby to them is helpful. Majority of the respondents of Vasant Kunj I(S1 site) care for the environment (91%) and most of them (98%) believes in the fact that it is our duty to keep environment clean & healthy & STP plays a vital role in it. Moreover only 29 % of the population stops people from throwing things in the STP. Also 50% of the people are aware that composition of waste can affect the functioning and effectiveness of STP.

Table 3.1 shows that in Timarpur (S2 site) only 53% of the people think that STP nearby to them is helpful. 79% people cares for the environment and 80% of the respondents believes in the fact that it is our duty to keep environment clean & healthy & STP plays a vital role in it & 14% of the population stops people from throwing things in the STP which shows that overall attitude of the people living near Timarpur STP is not very good towards the STP which justifies the poor working of the STP in the area.Also only 31% of the people are aware that composition of waste can affect the functioning and effectiveness of STP.

From Table 3.1 it is clear that in Okhla (S3 site) only 31% people thinks that STP is helpful and 51% of the respondents care for the environment only 69% of the respondents believes in the fact that it is our duty to keep environment clean & healthy & STP plays a vital role in it, 10%

of the people have the knowledge that composition of waste can affect the functioning and effectiveness of STP. Moreover only 4% of the population stops people from throwing things in the STP.

Table 3.2 Shows that the average attitude score of the people living near Vasant Kunj ISTP plant is around 50.45 whereas in Timarpur area it is 44.63 and least of 39.7 in Okhla plant.

Table 3.2: List of descriptive statistics

Descriptive Statistics	ATTITUDE		
	S1	S2	S3
Mean	50.45	44.63	39.71
Variance	30.03	28.41	55.65
Standard Deviation	5.48	5.33	7.46

In order to test whether there is a significant difference in the attitude of people living near three STP's, the following null hypothesis is framed:
H_0: There is no significant difference in the attitude of the people living near three different STP's. To test the hypothesis one way ANOVA was applied. The results of the test are shown in Table 3.3

Table 3.3: ANOVA test results for difference in the attitude of the respondents' of three different STP's

Source of Variation	SS	df	MS	F	P-value	F-critical
Between Groups	4140.78	2	2070.39	56.63	1.46E-21	3.03
Within Groups	10857.9	297	36.56			
Total	14998.7	299				

*Significant at 5% level.

From table 3.3, we can conclude that there is a significant difference in the attitude of people living nearby three STP's as the calculated value of F test is more than the tabulated value ($F_{Tab(2,297)}$ = 3.03) which implies that the null hypothesis is rejected i.e. there is a significant difference in the attitude of people living near three STP's.

The distribution of responses for statements pertaining to respondents' behaviour towards STP is shown in Table 3.4

Table 3.4: Level of respondents' behaviour towards their STP

Items	Strongly Agree			Moderately Agree			No Idea			Not Bothered			Moderately Disagree			Strongly Agree		
	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 (%)	S1 (%)	S2 (%)	S3 %
1	86	60	3	2	9	2	1	6	47	3	8	43	2	10	1	3	7	4
2	74	66	21	5	14	22	0	4	18	8	7	9	10	3	13	3	6	17
3	9	15	41	3	11	38	0	7	8	0	1	3	81	59	4	7	7	6
4	76	39	19	11	21	17	0	17	16	4	10	14	6	5	16	3	8	18
5	21	34	31	11	19	38	0	19	14	2	9	1	39	10	2	21	9	14
6	89	81	59	4	9	31	0	0	4	0	0	6	3	4	0	4	6	0
7	57	61	11	24	21	13	0	0	20	7	0	6	3	9	21	9	9	29
8	41	19	2	28	11	3	0	29	18	0	16	12	17	11	41	14	11	24
9	7	14	32	8	13	37	0	10	10	1	3	2	39	31	12	45	29	7
10	41	27	19	29	21	17	0	0	8	0	0	0	17	44	34	13	8	22

Table 3.4 shows that the behaviour of the people living inVasant Kunj I(S1 site) is overall good. 86% of the people living near the STP knows that the sewerage treated water can be reused for irrigation.74% of the people are aware that residential people contribute maximum to the influent entering the STP.

Also 76% of the respondents think about technical improvements in the STP which may solve many problems of STP and help in its better functioning hence contributing towards environmental care and only 7% of the respondents throw randomly their household waste in the sewers.89% of the people feels satisfied in doing something for betterment of the environment.

It is clear from Table 3.4 that in Timarpur (S2 site), 60% of the people living near the STP knows that the sewerage treated water can be reused for irrigation. Only 66% of the people are aware that residential people contribute maximum to the influent entering the STP. Also only 39% of the respondents think about technical improvements in the STP which may solve many problems of STP and help in its better functioning hence contributing towards environmental care and 14% of the respondents throw randomly their household waste in the sewers. 81% of the people feels satisfied in doing something for betterment of the environment.

Table 3.4 shows that in Okhla (S3), only 3% of the people living near the STP knowsthat the sewerage treated water can be reused for irrigation. Only 21% of the people are aware that residential people contribute maximum to the influent entering the STP. Also only 19% of the respondents think about technical improvements in the STP which may solve manyproblems of STP and help in its better functioning hence contributing towards environmental care and 32% of the respondents throw randomly their household waste in the

sewers. 59% of the people feels satisfied in doing something for betterment of the environment.

Table 3.5 Showsthat the average behavioural score of the people living nearVasant Kunj ISTP plant is around 49.47 whereas in Timarpurarea it is 45.32 and least of 39.39 in Okhlaplant which shows that the behaviour of the people affects the working of sewerage treatment plant functioning and hence the efficiency.

Table 3.5: List of Descriptive Statistics

Descriptive Statistics	BEHAVIOUR		
	S1	S2	S3
Mean	49.47	45.32	39.39
Variance	16.13	31.25	53.33
Standard Deviation	4.02	5.59	7.3

In order to test whether there is a significant difference in the behaviour of people living near three different STP's, the following null hypothesis is framed:

H_0: There is no significant difference in the behaviour of the people of three different sites. To test the hypothesis one way ANOVA was applied. The results of the test are shown in Table 3.6.

Table 3.6: ANOVA test results for difference in the behaviour of the respondents' of three different STP's

Source of Variation	SS	df	MS	F	P-value	F-critical
Between Groups	5133.13	2	2566.56	76.4528	1.64E-27	3.02615
Within Groups	9970.46	297	33.5706			
Total	15103.6	299				

*Significant at 5% level

From table, we can conclude that there is a significant difference in the behaviour of people living nearby the three STP's as the calculated value of F test is more than the tabulated value ($F_{Tab(2, 297)} = 3.03$) which implies that the null hypothesis is rejected i.e. there is a significant difference in the behaviour of people living near three STP's.

IV. CONCLUSION

The purpose of the study was to get the perception of human attitude and behaviour defining their responsibilities & concerns towards the environment protection. From this study it is clear that the attitude and behaviour of the people towards environmental careis also in the order similar to the results obtained from the experimental analysis i.e.

Mohali>Timarpur>Okhla. The results obtained during the study also proves that environmental knowledge, attitude and behaviour of people nearby to OkhlaSTP is least. Also there is lack of social work and environmental education among the people nearby to OkhlaSTP. Imparting environmental education can improve their knowledge and will definitely inculcate positive attitude in them will be reflected in their behaviour.

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