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REVIEW OF RESEARCH

HOUSEHOLD WASTEWATER AND ASSOCIATED PROBLEMS IN BALAJIPURAM AREA OF MATHURA CITY

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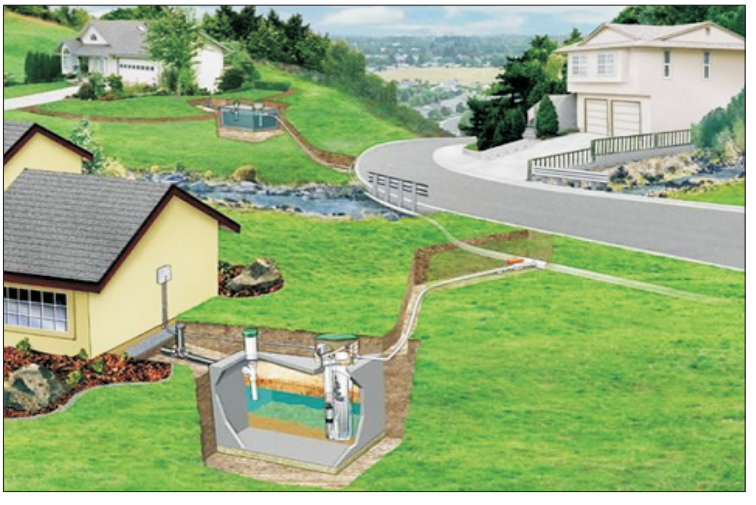
ABSTRACT:

The rapid exponential growth of population, industrial and technological advancement brought enormous problems and degradation of environment. In modern civilization, a large number of new cities and towns have arisen and the existing towns have grown, as a result of which house hold wastewater treatment plants have become necessary. An efficient waste water disposal is important to the health of any community. Effective collection and treatment of wastewater is such a critical problem especially in developing countries like India. Wastewater may be defined as any water that has been adversely affected in quality by human influence including liquid waste discharged by houses, schools, hospitals (Nursing homes) industries etc.

Nitrogen in waste water is present either as ammoniacal nitrogen and originally bound nitrogen derived from proteinaceous matters. The ammoniacal nitrogen constitutes about 50-70% of the total nitrogen. The domestic wastewater contains large amount of urine, which consists of about 2.5% urea, 1% NaCl and other complex organic substances. The waste water also includes many inorganic substances such as nitrates and phosphates of detergents and Na+, K^+, Ca^{2+}, Cl^-, HCO_3– ions etc.

Present day wastewater contains appreciable amounts of synthetic detergents. In addition to surface active agents, they also contribute phosphates of sodium and other builders. The waste water also includes biodegradable feces, animal wastes and certain household wastes in the form of organic compounds such as fats, carbohydrates, proteins etc. As seen previously, some of these matters are carried in suspension, others are taken into true solution, still others become so finally divided that they possess the property of colloidal i.e. dispersed, ultramicroscopic particles.

There are two important types of bacteria which are present in the sewage in very high quantity. These bacteria are saprophytic bacteria and pathogenic bacteria. Saprophytic bacteria are harmless and feed upon dead organic matter. Pathogenic bacteria cause disease in man and animals. A large portion of the wastewater of houses is organic in nature and because of its high energy value it is subject to attack by saprophytic bacteria or micro-organisms. Household



wastewater is therefore unstable, decomposable and may give rise to offensive odours, notably those of H2S and other objectionable conditions associated with decomposition. Pathogenic bacteria such as Vibrio cholerae (causes cholera), Salmonella typhi (causes typhoid) and Shigella dysenteriae (causes bacillary dysentery) are either discharged by persons harbouring intestinal parasites or suffering from infections diseases (such as typhoid, paratyphoid dysentery and other gastrointestinal infections). Due to water logging the most frequently reported diseases in the study area are chikungunya, malaria, dengue, dysentery, jaundice and typhoid.

Balajipuram area of Mathura city has taken as a study area. The aim of present paper is to examine the release of household wastewater and its associated problems. The paper also shows some of the important findings and suggestions.

KEYWORD: *Wastewater, environment, population, water borne disease.*

INTRODUCTION :

The quality of water is of vital concern for mankind since it is directly linked with human welfare. It is a matter of history that faecal pollution of drinking water caused water-borne diseases which wiped out entire population in cities. At present, the menace of water-borne diseases and epidemics still looms large on the horizon of developing countries. Polluted water is the culprit in all such cases. The major sources of water pollution are domestic waste and industrial waste are discharged outside the houses, create water-logging, a suitable place for growing & breeding for dangerous micro-organisms, mosquitoes, etc.

Wastewater is any water that has been adversely affected in quality by anthropogenic influence. It includes liquid waste discharged by domestic houses, industry, commercial properties and hospital waste etc. The proper collection and treatment of wastewater equally save the environment from deterioration on one hand and human health on the other hand. Effective collection and treatment of waste water is such a critical problem especially in developing countries like India.

But very few people are conscious about the cleanliness of their bathrooms and toilets and disposal of black and grey water. Dirtiness of toilets, bath rooms and improper release of household wastewater cause uncountable problems. They create problems of water logging which resulting into deterioration of environment and occurrence of diseases.

Nitrogen in wastewater is present either as ammoniacal nitrogen and originally bound nitrogen derived from proteinaceous matter. The ammoniacal nitrogen constitutes about 50-70% of the total nitrogen. The domestic waste water contains large amount of urine which consists of about 2.5% urea, 1% NaCl and other complex organic substances. The waste water also includes many inorganic substances such as nitrates and phosphates of detergents and Na^+, K^+, Ca^{2+}, Cl^-, HCO_3– ions etc.

The wastewater also includes biodegradable feces, animal wastes and certain household wastes in the form of organic compounds such as fats, carbohydrate, proteins etc. some of these matters are carried in suspension, other are taken into true solution, still others become so finally divided that they possess the property of colloidal i.e. dispersed, ultramicroscopic particles.

There are two important types of bacteria which are present in the sewage in very high quantity. These bacteria are saprophytic bacteria and pathogenic bacteria. Saprophytic bacteria are harmless and feed upon dead organic matter. Pathogenic bacteria cause disease in man and animals. A large portion of the wastewater of houses is organic in nature and because of its high energy value it is subject to attack by Saprophytic bacteria or micro-organisms. Household waste water is therefore unstable decomposable and may give rise to offensive odours, notably those of H2S and other objectionable conditions associated with decomposition. Pathogenic bacteria such as Vibrio cholerae (causes cholera), salmonella typhi (causes typhoid) and Shigella dysenteriae (causes bacillary dysentery) are either discharged by persons harboring intestinal parasites or suffering from infections diseases (such as typhoid, paratyphoid, dysentery and other gastro-intestinal infections).

COMPOSITION OF WASTEWATER

Waste water is very complex in its composition. It contains a variety of organic & inorganic compounds of

anthropogenic & natural origin. The naturally occurring constituents in waste water were present in the source water that was supplied to the user. Generally, it is mainly comprised of water (99.9%) and 0.1 % total (dissolved & suspended) solids. Furthermore, of the 0.1 % total solids (TS) only half are organic in nature, the other half are inert. Among the organic substances, carbohydrates, lignin, fats, soaps, synthetic detergents, proteins are important because principal goal of domestic waste water treatment plant is to concentrate the pollutants into a setteable sludge that can be further treated to produce energy through anaerobic digestion and a stable, compost like end product with substantial fertilizer value that can be land applied. The concerns with land applications of bio-solids deal mainly with the potential for contamination of surface water supplies due to the nitrogen & phosphorus that can be resolublized.

The organic composition of municipal waste water is approximately 50 % proteins, 40 % carbohydrates, 10 % fats & oils and trace amounts of priority pollutants and surfactants. Of the trace components surfactants may be the largest constituent. These are present in detergent, soap, shampoo and similar consumer products.

The solids in waste water can be attributed to various domestic & industrial activities. The typical per person contribution of solids to domestic waste water is 250 gms per day. The majority of this total is from waste water (sinks, baths, laundry, etc.). The typical faecal amount is approx. one fourth of the total per person solids contribution.

The use of home water softens in areas with hard water (i.e. the source water contains high concentration of calcium and magnesium) can contribute to the total sold concentrations.

The present table shows the major concentration of these solids in household wastewater.

Constituent	*Concentration mg/l*		
	Strong	**Medium**	**Weak**
Total solids	1200	700	350
Dissolved solids (TDS)'	850	500	250
Suspended solids	350	200	100
Nitrogen (as N)	85	40	20
Phosphorus (as P)	20	10	6
Chloride	100	50	30
Alkalinity (as $CaCO_3$)	200	100	50
Grease	150	100	50
BOD^2	300	200	100

The amount of TDS and chloride should be increased by the concentrations of these constituents in the carriage water.

BOD is the biochemical oxygen demand at 20^0C over 5 days and is a measure of the biodegradable organic matter in the waste water.

Source: UN Department of Technical cooperation for development (1985).

Household waste water carries dirt, soap, food, grease and bodily waste down the drain and out of our house. This waste water which starts in sinks, toilets, showers & washing machine also can carry nutrients and pathogens. Nutrients can impair water quality & pathogens can cause disease. Waste-water treatment systems are designed to remove and break down these contaminants before they enter ground water and nearby lakes, streams or wet lands. Because waste-water treatment is often out of sight and mind until problems occur, we must know the basics of our household waste water system and take simple precaution to help prevent future problems and costly repairs.

Keeping this view in mind, it is very important to enquire study and to know the problems of water logging and wastewater release through household survey. Thus to remove the problems door to door survey and awakening of people is compulsory.

A. Objective of the study

- To examine the release of household wastewater.

- To assess the drainage systems in the study area.
- To assess the general environment of the area.
- To examine the health conditions of the residents.

B.Database and Methodology

The paper is based on primary sources of data collected through Well prepared questionnaire.
Out of total household 90 household were sampled to assess the real problems. Simple percentage method and Bar diagram have been used to draw the conclusion.

C. Study Area

The city of Mathura is located in the western part of the state of Uttar Pradesh at 27.28^{0}N 77.41^{0}E. It is a part of the great northern plains and is situated on the west bank of the river Yamuna.

The 2011 census of India estimates the population of Mathura to be 441894. Population density is 761 km^2 and has an average literacy rate of 72.65 in 2011.

It experiences south western monsoon rains from July to September. The drainage system of the city is defective because there is lack of natural drainage system. The most of the rain water collects in pits and in the low lying areas because there is no outlet. Most part of the city as well as study area get water logged during the rainy season.

Balajipuram is a small village in Mathura District. It comes under Tantura Panchayat. It is located 5 km. towards south from district headquarters. It consists of four Mohallas e.g. Brij Highway Residency, Saraswati Vihar, Saroj Vihar and Sarang Vihar.

D. Respondent Profile

Out of total respondents who were questioned during the survey it was found that 97% are Hindus while

3% belong to other religion, in which 75% are from rural background and 25% are urban citizens. Most of them have cattles in their houses for milk production and fuel. The male members of maximum families are either in army, navy or in police departments. The women in these families keep cattle (cow, buffaloes, goat etc.) for their livelihood.

Regarding the educational status, maximum 70% are uneducated while rest are educated. As far as income is concerned, 50% of the people belongs to lower income group.

DISCUSSION

The results which were obtained after analysing the collected data are very interesting. The first point of our analysis was to examine the status of drainage systems around the houses. Generally all houses have drainage facility around their houses but mostly were open drainage. About 20% houses have closed tank system. In 80% around 70% percent drains are Pucca (Lined) while 30% drains are Kuchcha (unlined).

Regarding the disposal of household wastewater around 20% houses release their sewerage into close tanks and their waste water into pucca nali drains. Around 80% houses release their waste water from the house into pucca nali (drain) which after few meter distance collects around their houses. It reflects that majority of the household wastewater in localities like Saroj Vihar, Saraswati Vihar and Sarang Vihar goes around the houses and in Brij Highway residency it goes into drains. The result shows that Sarang Vihar, Saroj Vihar and Saraswati Vihar localities do not have proper drainage facility.

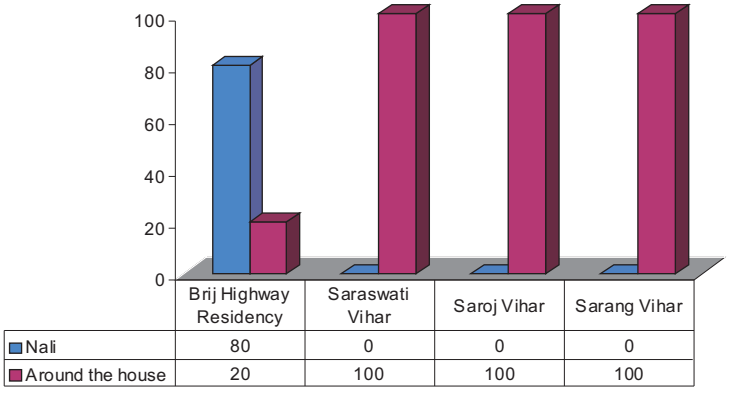
LOCATION OF THE STUDY AREA

Source: Municipal Corporation, Mathura

As far as waste water logging is concerned, it has been resulted that 80% rain water creates the problem of water logging during rainy season, while 20 percent wastewater are responsible for water logging during this

season. In general whole area of Balajipuram suffers from the problem of water logging.

DISPOSAL OF HOUSEHOLD WASTEWATER IN BALAJIPURAM (%)



	Brij Highway Residency	Saraswati Vihar	Saroj Vihar	Sarang Vihar
Nali	80	0	0	0
Around the house	20	100	100	100

Source: Based on field Survey 2016

Finally, the last aspect that was examined in this area is diseases. The most frequently reported diseases in the study area was chikungunya, malaria, dengue, typhoid, dysentery, allergy and viral fever and few cases of typhoid were reported. Unless this circumstances, around 70 percent people consult private doctor.

CONCLUSION AND SUGGESTION

After complete analysis, we came to know that each Mohalla is facing different types of problems. Drains around the houses were open in all Mohallas except Brij Highway Residency. Majority of the houses do not have proper drainage system to release their household water. Garbage along the road were common in the study area and it creates the problems of water logging.

So, in order to solve the various problems in the study area, micro level planning is needed. Through proper planning we can overcome various problems not fully but up to a certain extent. First of all it is the duty of people to keep their surroundings clean. They should realize their responsibilities and should help in the betterment of the society.

Different administrative organization and municipality can help to activate development plans in various Mohallas.

Finally different non-governmental organization (NGO's) can help up to a large extent to solve the problems of water logging and waste water.

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