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Physico-Chemical Investigation of Quality of Drinking Water Affected by Ganapati Visarjan in Maharashtra, India

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ABSTRACT

The object of this work was to study the quality of drinking water from rivers in selected area of Amravati district of Maharashtra, India. This paper is intended to be a study concerning with surface water quality in various river affected by Ganapati Visarjan. While monitoring samples were collected in September 2015 from sampling sites before Ganapati Visarjan and after Ganapati Visarjan to evaluate relative differences in Physicochemical properties of river water such as Turbidity, Silica, Hardness, COD, TDS, DO, Phosphate, Alkalinity, Sulphate, Ca²⁺, Mg²⁺, Cl⁻, etc. The results are compared with standards of World Health Organisation (WHO), United States Public Drinking water Standard (USPH) and Indian Council of Medical Research (ICMR).

Keywords: Physico-chemical analysis of water, Hardness, COD, BOD, Maharashtra, ganapati Visarjan.

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INTRODUCTION

Water is used as a universal solvent in many organic and inorganic compounds. Water is one of the most important and abundant compound of the ecosystem. All living organisms on the earth need water for their survival ^[1]. It is difficult to understand the biological phenomenon fully because the chemistry of water reveals much about the metabolism of the ecosystem and explain the general hydrobiological relationship ^[2]. Better Quality of water described by its Physical, Chemical and Biological

Characteristics. But some correlation was possible among these Parameters and the significant one would be useful to indicate quality of water ^[3].

Maharashtra is well known state for ganapati festival in india. These festivals show high impact on water quality because of ganapati visarjan in rivers and dams. In many parts of the country available water is rendered non-potable because of the presence of heavy metal in excess because of ganapati visarjan these water gets contaminated and drastically changes occurred in various parameters. These changes directly effect on plants, animals, aquatic animals etc ^[4].

Study Area: Study area is selected from Amravati district of Maharashtra state, India. And sample was collected from Nagthana dam and Soki River before and after ganapati Visarjan. Sample point in indicated in table number 1, and shown in figure number 1 and 2.



Figure 1. Satellite image of Nagthana Dam



Figure 2. Map of Amravati District

MATERIALS AND METHODS

The following methodologies was adopted during the present investigation-

- 1) Data collection regarding the Physico-Chemical analysis.
- 2) Two litre polyethylene bottles is washed with deionised water several times then dried and used to collect sample from sample point.

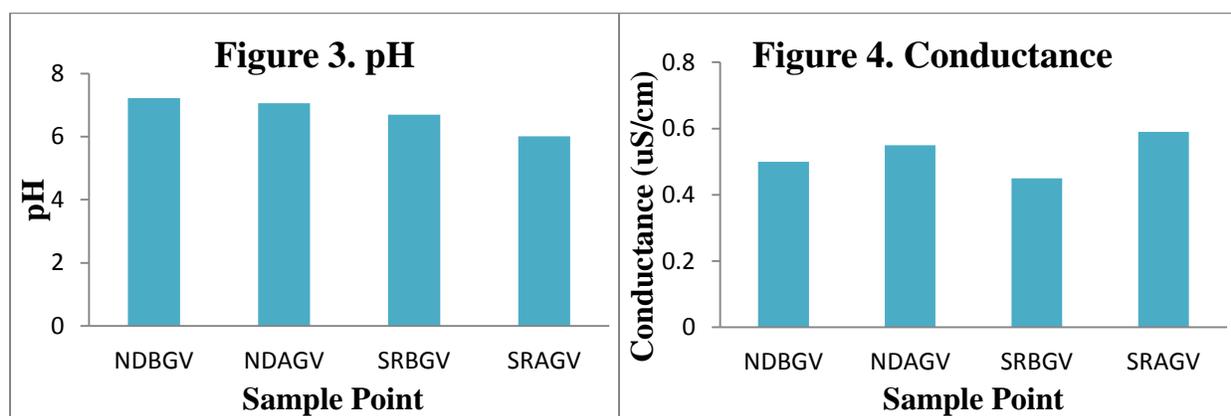
- 3) pH, DO, Temperature was investigated at the time of sample collection to take a exact reading.
- 4) Proper sampling and preservation techniques for collecting water samples for DO, COD etc.
- 5) Collected sample was keep in dark in the laboratory to restrict

Methods used for estimation of various parameters are shown in Table number 2 and results are depicted in table 3.

RESULT AND DISCUSSION

pH: pH is ranges between 6.01 to 7.22 and it is found that it is decreases after ganapati Visarjan in to dam and river. (Figure 3)

Conductance: Conductance is increases very smoothly after ganapati Visarjan into dam and river. (Figure 4)

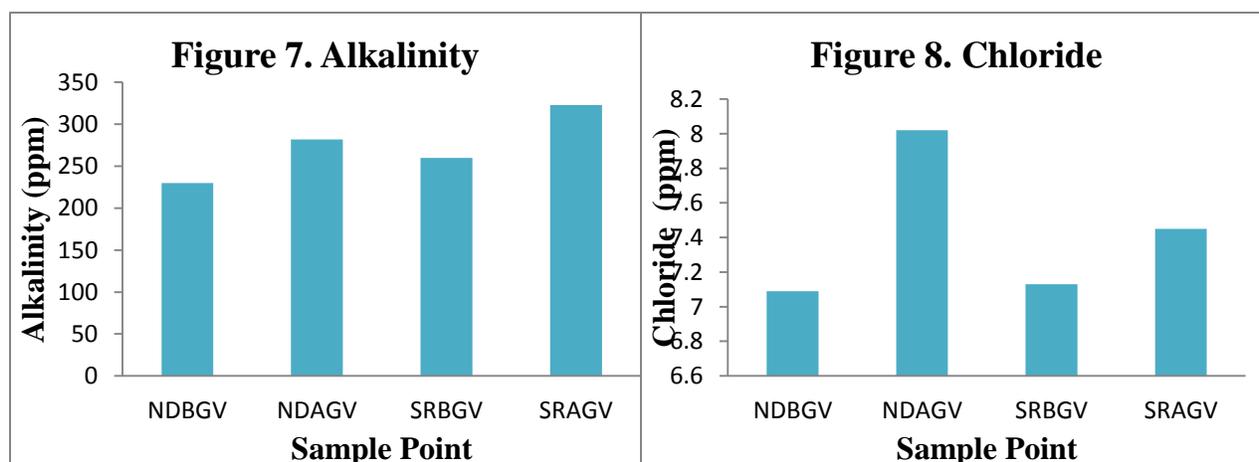
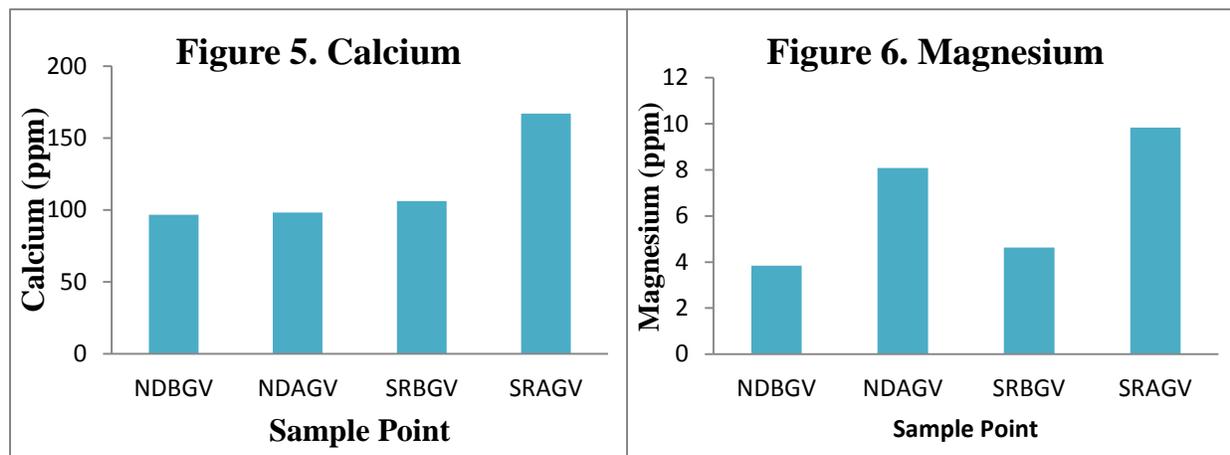


Calcium: The water above Calcium values 25 mg/l are classified as „Calcium rich“. Calcium is increases smoothly in Nagthana dam water after ganapati Visarjan but increases rapidly in Soki river after ganapati Visarjan. (Figure 5)

Magnesium: Magnesium is found in seawater (about 1300 p pm) and oceans (after the sodium) in big quantity. Rivers contains approximately 4 ppm of magnesium. Magnesium and other alkali earth metals are responsible for water hardness. Result concludes that value of magnesium increases rapidly in both Nagthana dam and Soki river after ganapati Visarjan. (Figure 6)

Alkalinity: Alkalinity is important to aquatic organisms because it protects them against rapid changes in pH. The value of alkalinity ranges between 230 to 323 which indicates that alkalinity increases slowly in both Nagthana dam and Soki river after ganapati Visarjan. (Figure 7)

Chloride: The suitability of water resource for the irrigational use in agricultural is depends on its salt concentrations, especially Chloride contents. The study shows that value of chloride increases very slowly. (Figure 8)

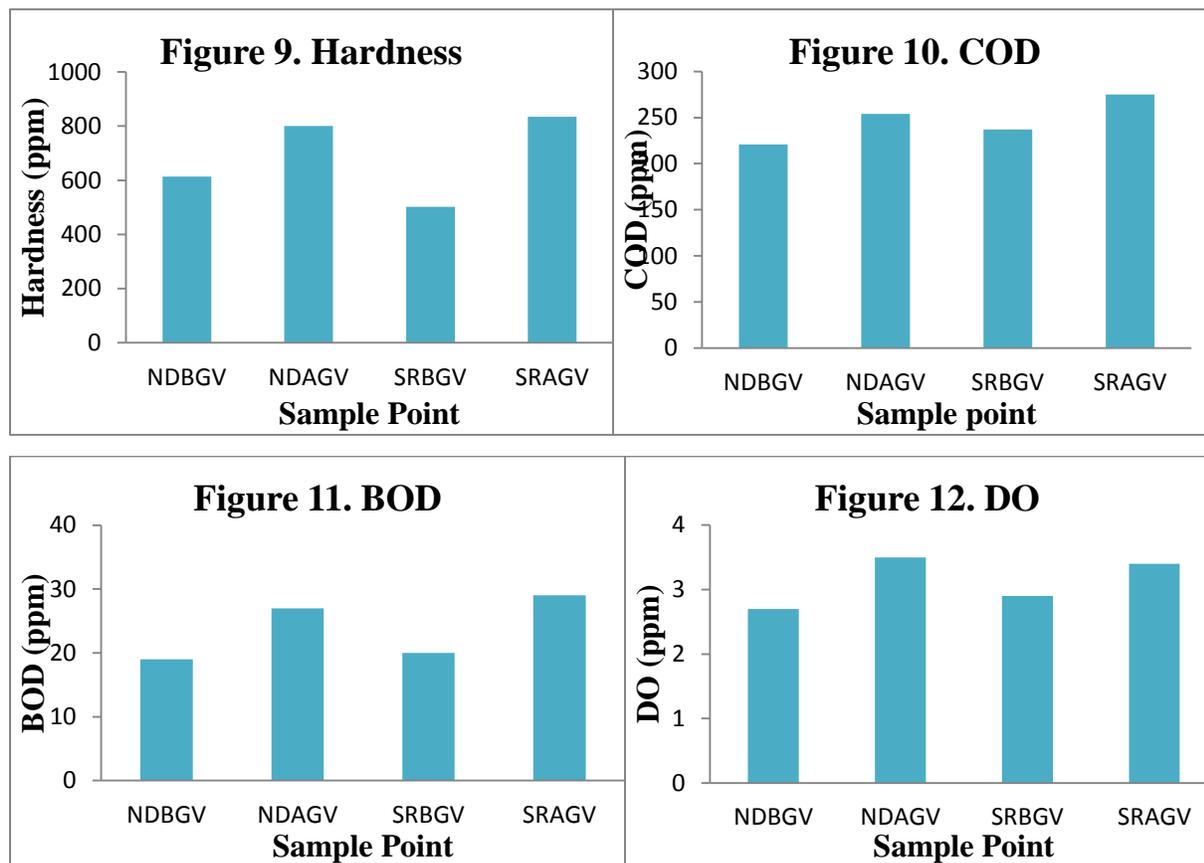


Hardness: Total hardness of water is caused by the presence of Calcium and, Magnesium salts. Hardness has no known adverse effect on health. However, maximum permissible level has been prescribed for drinking water is 300mg/l, by WHO. According some classifications water having Hardness up to 75 mg/l is classified as soft, 76 to 150 mg/l is moderately soft, 151-300 mg/l as hard and more 300 mg/l as very hard. The present investigation shows that the value of hardness increases very rapidly after ganapati Visarjan in Nagthana dam and Soki river also. (Figure 9)

COD: C.O.D. is the major of oxygen consumed during the oxidation of oxydisable organic matter present in the water. COD values are increases very slowly after ganapati Visarjan in Nagthana dam and Soki river. (Figure 10)

BOD: Visarjan of ganapati in Nagthana dam and Soki river indicates that BOD values are increases. (Figure 11)

DO: If water is too warm, there may not be enough oxygen in it. When there are too many bacteria or aquatic animal in the area, they may overpopulate, using DO in great amounts. From the present investigation the Value of dissolved oxygen is also increases after ganapati Visarjan into Nagthana dam and Soki river. (Figure 12)



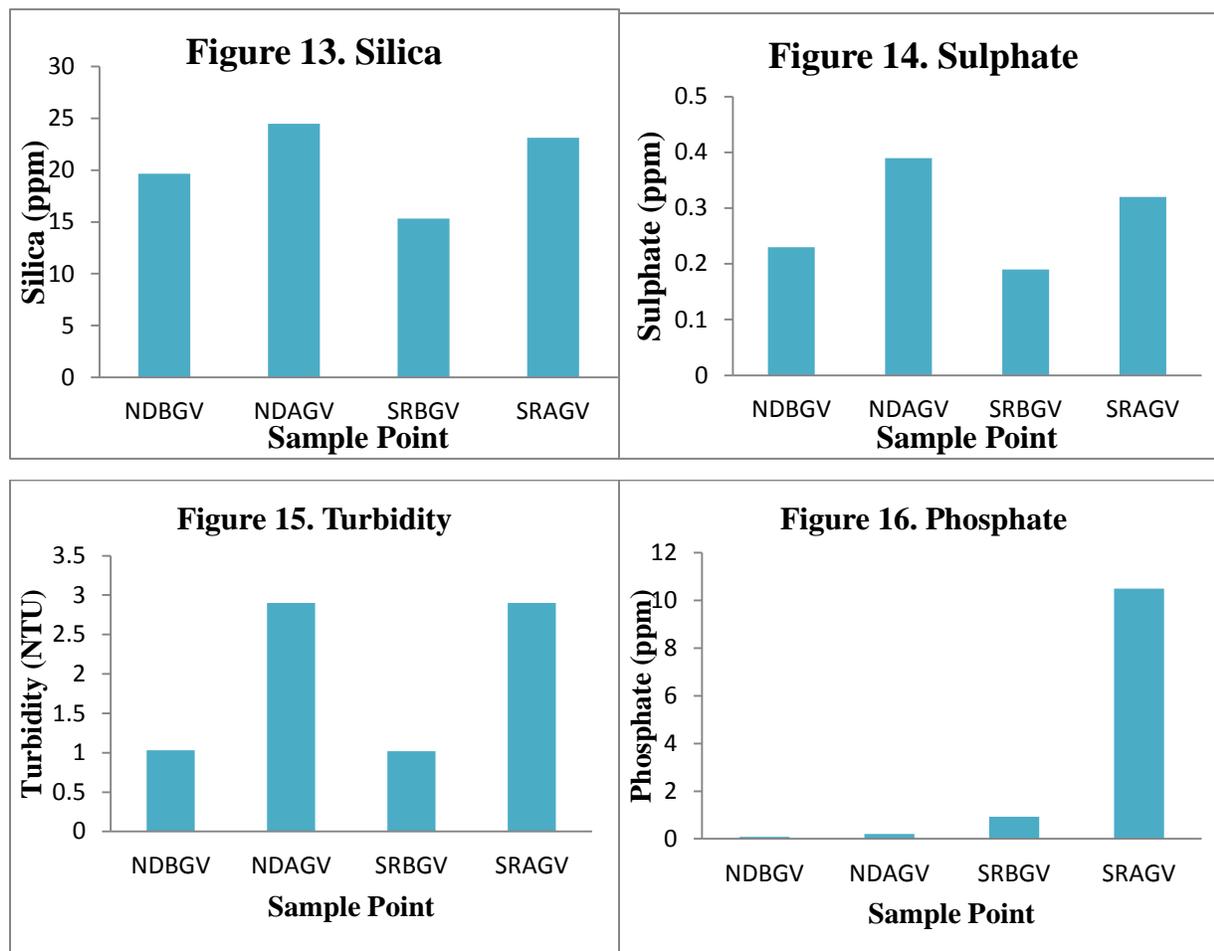
Silica: Silica (SiO_2) is an oxide of silicon, and is present in almost all minerals. In the present study Value of silica is increases drastically into both Nagthana dam and soki river after ganapati Visarjan. (Figure 13)

Sulphate: There have been a number of studies conducted to determine the toxicity of sulphate in humans. Case reports of diarrhoea in three infants exposed to water containing sulphate at concentrations ranging from 630 to 1150 mg/litre have been presented. In the present study Value of sulphate increases smoothly. (Figure 14)

Turbidity: Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. It is essential to eliminate the turbidity of water in order to effectively disinfect it for drinking purposes. Result indicates that Turbidity value is also increases after ganapati Visarjan. (Figure 15)

Phosphate: Value of phosphate increases very slowly.

All the observed values of parameters are shown by graphical representation for better understanding the effect on water quality by ganapati Visarjan. (Figure 16)



CONCLUSION

Study provides an overview on the assessment of water quality affected by ganapati Visarjan. From the study it is conclude that, the every Physico-chemical parameter is drastically changes after Ganapati Visarjan into the river and dam water. The quality of water is not suitable for drinking purposes as well as agricultural use. Hardness, Turbidity, Magnesium, Calcium values are increases rapidly which are injurious to human being, plants and animals.

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