

# An investigation of pollution status of Machna river water, Dist. Betul Madhya Pradesh

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## Abstract

In the present study, an attempt has been made to evaluate the water quality of "Machna River" flowing through Betul city (M.P.) for a period of 06 months to assess the suitability of water for irrigation and drinking purposes. The parameters observed for this present study were Sodium Absorption Ratio (SAR), Electrical Conductance (EC) and Sodium Percent (SP). Present observations confirm that the water quality of Machna River water is suitable for irrigation and drinking purposes.

**Key Words:** Machna River, Water Quality, Irrigation, Sodium Absorption Ratio, Electric Conductance, Sodium Percent, Salinity.

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## INTRODUCTION

An attempt has been made in the present study to evaluate the the quality of "Machna River" water of Betul city (M.P.) with respect to its suitability for irrigation and drinking purposes. Betul, one of the districts of Madhya Pradesh is situated nearly 190 kms. South-west of capital city Bhopal. The need of water for irrigation, industrial and other purposes is not only fulfill from Machna River water but also the life-line of drinking water need of the most part of Betul city. The river originates from village Barsali and ultimately confluence with river Tawa and finaly joins the river Narmada.

## MATERIAL AND METHODS

Water quality assessment was made during 06 months from Jun. 2017 to Nov. 2017. The samples were collected from different points to cover the complete area of river water flow. The analysis of water samples were performed employing standard methods for examination of water and waste water (APHA 1992) and evaluated for its suitability for irrigation and drinking uses with

reference to Sodium Absorption Ratio (SAR), Electrical Conductance (EC) and Sodium Percent (SP). Quantitative determination of Sodium was made with the help of Flame Photometer, Electrical Conductance was measured by Digital Conductivity Meter. SAR and SP were calculated by the formula given in IS-2296 (1982).

## RESULT AND DISCUSSION

The mineral components of the water is directly related to agricultural utility and its parametrically values decide the suitability for irrigation purposes. WICOX- (1995) has made and attempt to clarify the quality of water with respect to irrigation and drinking purposes by taking into consideration Sodium and Electrical Conductance as vital parameters (Table 2). It is well known that Electrical Conductance is good index of dissolved solids and excessive presence of Sodium in water is not only unsafe for irrigation but also makes soil uncultivable.

**Table 1:** Salinity Classification of Irrigation Water Based on SAR

| Water Class | SAR     |
|-------------|---------|
| Excellent   | 10      |
| Good        | 10 – 18 |
| Fair        | 18 – 26 |
| Poor        | 26      |

**Table 2:** Quality of Drinking and Irrigation Water Based on VICOX (1955)

| Water Class | Sodium Percent (SP) | Electrical Conductance $\mu\text{mhos/cm}$ |
|-------------|---------------------|--|
| Excellent   | 20                  | 250  |
| Good        | 20 – 40             | 250 – 750                                  |
| Permissible | 40 – 60             | 750 – 2000                                 |
| Doubtful    | 60 – 80             | 2000 – 3000                                |
| Unsuitable  | 80                  | 3000                                       |

**Table 3:** Water Class of Machna River Water Based SAR, SP and EC

| Parameter                     | Value         | Class     |
|-------------------------------|---------------|-----------|
| Sodium Absorption Ratio (SAR) | 4.9 – 6.54    | Excellent |
| Sodium Percent (SP)           | 14.64 – 18.28 | Excellent |
| Electrical Conductance (EC)   | 153 - 238     | Excellent |

In the present investigation, it has been observed that the Sodium Percent and Electrical Conductance are in the range of 14.64 to 18.28 and 153 to 238  $\mu\text{mhos/cm}$  respectively (Table 3). It clearly indicates that the quality of water of Machna River comes in excellent category. Another parameter, Sodium Absorption Ratio (SAR) is a reliable parameter for assessing Sodium Hazard. The salinity hazards get to the soil utility during irrigation. While comparing the present results of Machna river water, its SAR is observed as ranges from 4.9 to 6.54. This value is very low when compared with salinity classification of irrigation water. Hence it comes in excellent category.

## CONCLUSION

While comparing the obtained data of Machna river according to WICOX, it reveals that the Machna river water quality is excellent for irrigation and drinking purposes.

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