



## Studies of Physicochemical Parameters of Water and Locked Soil of Narawala Reservoir of District Badwani M.P. (India)

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### Abstract:

In order to understand the water quality and locked soil of Narawal resesrvoir Physicochemical parameters were studied and analysed in November 2013. Various physicochemical parameters, such as water temperature, ph, turbidity, transparency, total hardness, Ca hardness, Mg hardness, alkalinity, chloride content, electrical conductivity, colour were analyzed. As above the physico chemical parameters of locked soil such as ph, colour, temperature, grain seize, specific gravity, moisture content, elasticity and plasticity were analyzed in above period.. The results revealed that there was significant variation in some physicochemical parameters and most of the parameters were in normal range and indicated better quality of reservoir water. It has been found that the water is best for drinking purpose in seasons. Narawala reservoir, a small inland reservoir located in Village Narawal, District Badwani, Madhya Pradesh, India. . The nutrients including are in sufficient quantities for the growth of aquatic animals in the reservoir. Therefore, the conservation and management of this water body is very much required. The result indicated that the some physico chemical parameters of reservoir water and locked soil were within the permissible limits and can be used for domestic and irrigation purpose but some of the parameters were above standered for drinking water so there is need for strict monitoring to ensure quality water supply for human health.

**Keywords:** Alkalinity, chloride content, hardness, moisture content, Physico-chemical parameters, plastic limit.

### 1.0 Introduction:

The reservoir serves as a rich source of water supply for irrigation, drinking to nearest villages & fish culture. The quality of water is getting polluted due to the industrialization, Urbanization and indiscriminate use of pesticides in agriculture which runoff with water and contaminate the water bodies. The Narawala reservoir is a minor type of reservoir constructed in 1979. This reservoir provides water supply for Rajpur place and nearby villages. It is 10 km away from Rajpur. It is constructed basically for agricultural purpose. But water is supplying for drinking purposes also, hence the quality of water for potability is assessed on the basis of physico-chemical parameters in order to provide the information.( Chaturvedi RK *et al* 1999).

The quality of water and locked soil in any ecosystem provides valuable information about the available resources for supporting life in that ecosystem The quality of water and locked soil

depends as a large number of physico chemical parameters and analysis. The impact of water pollution and soil pollution on the human being has recently become a favorite subject for investigation in the world.

The industrialization and development in agriculture are necessary to meet the basic requirement of people; at the same time it is necessary to preserve the environment. The Village effluent waste waters are loaded with pollutant, along with other chemicals used during agriculture are also responsible for water and soil pollution. The aim of the study is too reveled out the pollution status of reservoir in terms of physico chemical characters of water and locked soil. The reservoir contain soil which covered by water called locked soil. In the water depth of approximate 3-4 feet soil samples collected for investigation and analyzed. The pollution of lakes and reservoir and their biological diversity are directly related to the health of human beings. .( Gopal B and Zutshi D P 1998).

The main aim of this work has to analyze various physico chemical parameters of water and locked soil of Narawala reservoir of Rajpur M.P. With the analysis of these parameters of water and locked soil shows the pollution status of water and soil of this reason. Monitoring of water quality is the first step that can lead to management and conservation of aquatic ecosystems. It is also true that the management of any aquatic ecosystem is aimed to the conservation of its habitat by suitably maintaining the physico-chemical quality of water and soil within acceptable levels.

## 2.0 Materials and Methods:

The soil and water samples were collected from three different sites of Narawala reservoir during October 2013. The collected samples have been analyzed to determine their physico-chemical characteristics. The water and locked soil samples were collected in morning time. Temperature and pH was recorded on the field. Water and soil samples were collected in cleaned acid washed plastic bottles and sterilized plastic bags and stored at 4°C. the locked soil was dried in atmosphere at room temperature. The soil samples have been analyzed for various parameters as pH, electrical conductivity (EC), plasticity, elasticity,

moisture content, specific gravity. Physicochemical parameters of water and soil were done by standard methods. .( Hujare M. S. 2008).

Narawala, a small man-made reservoir with 98 ha water spread area, was built over a Small Rupa river. The reservoir is located approximately 10 km northwest of Rajpur Tehsil in Madhya Pradesh, India and approximately 35 km East of Badwani. This reservoir is a multipurpose point tank used for different activities like drinking water supply, irrigation, fisheries etc. Three sampling station map of Narawal reservoir showing sampling stations. stations, namely, point 01, point 02, point 03 were selected for analysis of physico-chemical characteristics of water covering whole area of the reservoir (Figure 1and 2).

Narawal reservoir located at the central part of Badwani District, is undergoing rapid urbanization and agriculture purpose. Narawal reservoir was completed in1979 and having irrigation capacity of 365 hector which irrigated approximate 243 hector Kharib and 122 hector of Rabi crops. It is spread in 98 hectors. The length of reservoir is 4.88 meters and height is 15.05 meters.



Fig. 1: Narawal Reservoir



Fig. 2: Narawal Reservoir

3.0 Results:

Table 1:- Parameters of Narawala Reservoir water

PARAMETER	POINT 01	POINT 02	POINT 03
Colour	Pale yellow	Pale yellow	Pale yellow
Odour	Sweet	Light sweet	Light sweet
pH	7.4	7.5	7.6
Temperature	28 <sup>0</sup> c	28 <sup>0</sup> c	28 <sup>0</sup> c
Total hardness	104	100	105
Ca hardness	22	20	21
Mg hardness	82	80	84
Alkalinity	96	95	98
Chloride Content	72.55	74.55	74.55
Carbonate Alkalinity	40	40	41
Bicarbonate Alkalinity	56	55	57

Hardness, chloride content and alkalinity parameters are in PPM

Table 2: Parameters of Narawal Reservoir locked soil

PARAMETER	POINT 01	POINT 02	POINT 03
Colour	Black	Black	Grey
pH	7.0	6.9	6.9
Temperature	30	30	30
Grain seize	Cohesive	Cohesive	Partially Cohesive(Large)
Specific gravity	2.50	2.54	2.52
Moisture content	30	31	25
Plastic limit	40	42	35
Liquid limit	43	42	38

The physico-chemical properties of locked soil and the water used for irrigation in Rajpur area of Badwani were analyzed in the present study. The physico-chemical characteristics of the effluent water showed that water analyzed in this study had pH 7.5 and the pH of locked soil is 7.0. The physicochemical characteristics of the effluents differed substantially from one another with respect to chemical characteristics, as expected due to a relatively wide spectrum of effluent. The temperature 28<sup>0</sup>C. A wide variation in the physico-chemical properties of soil of agricultural region and the water in Narawala reservoir area were found in the present study. Different samples of soils and water from the Rajpur area showed difference in the physico-chemical characteristics from one another with respect to chemical characteristics, as expected due to a relatively wide spectrum of agriculture effluents sources and due to presence of chemical in the effluent. (Shown in table 1 and table 2). Narawala reservoir water falls under the category of mesotrophic water body. Clay, silt, organic matter, plankton and other microscopic organisms cause turbidity in natural waters.

4.0 Conclusion:

Conservationists are meticulously attempting to conserve the biodiversity from anthropogenic erosion and ‘pre natural’ extinction. The major barriers in conservation of biodiversity for sustainable life in future include Inadequate data base, inadequate funding for research, confusions and controversies over area selection for conservation. This has made the task more and more difficult. On the basis of physicochemical characteristics it may be said that the Narawal reservoir is a mesotrophic water body, which is slightly inclined towards eutrophication. The tropic status of reservoir warrants a proper conservation and management and best possible use of the reservoir, the macrophytes will have to be controlled. This can be achieved by mechanical removal or by biological means using grass carp. Since the removal of nutrients in the form of biomass can only check eutrophication. The nallahs, streams and rivers let’s joining the reservoir should be obstructed by constructing stop and check dams. This will not allow the siltation in reservoir. (Kadam M.S. *et al* 2007)

This soil study shows that considerable amount of soil and plant nutrients were lost through erosion in the northern upland areas of Rajpur. The observed differences in soil loss permitted an assessment of the impact of soil erosion on some soil properties.

This study also indicates that top soil loss due to accelerated erosion results in changes in soil properties. Changes in soil pH, elasticity, and plasticity and moisture contents were highly and positively correlated with cumulative soil loss. This study indicates the level of contamination at the waste and explores the relationship between ranges of quantitative variables. Thus the open waste should be discouraged and a proper monitoring and remediation plan is needed to reduce the chances of ground water pollution by leaching of these contaminants. Some physical properties and good amount of organic matter in soils indicate that these soils have the potential to be used in compost after various experimental treatments. The study is useful in providing indicators of contamination at such dams and thus will be helpful in making any remediation plan for these contaminated soils. (Kamble S.M. *et al* 2009)

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