



## COMPARATIVE ASSESSMENT OF LAKE SEDIMENTS AND AGRICULTURAL SOIL IN THE VICINITY OF BADNERA REGION, AMRAVATI

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### ABSTRACT:

Lake sediments are composed mainly of sediments, silt and sand, organic debris, chemical precipitates or combination of these. Soil eroded and delivered from cropland as sediments usually contains a higher percentage of finer and less dense particles than the parent soil on the cropland. In present study Sample from Manjari lake sediments and agricultural land near Manjari lake were taken. Also, samples from kondeshwar lake sediments and agricultural land sediment and agricultural land near Manjari lake were taken for study purpose. Finding of research shows that level of pH, Conductivity, Organic carbon, N.P.K. is comparatively more in Manjari lake than agricultural land. This shows that Manjari lake sediments are more fertile than agricultural soil. From all the findings it is concluded that Manjari lake sediments can be used as fertilizer for improving soil quality of agricultural land. It will prove to be a helping hand for increasing the depth of lake and thereby reducing eutrophication. In case of kondeshwar lake, Lake sediments are not that much useful for agricultural purpose as agricultural land near kondeshwar lake is more fertile than the lake sediments. But it may be used for increasing the fertility of the bare areas in the vicinity of the kondeshwar village.

### INTRODUCTION :

Soil eroded and delivered from cropland as sediments usually contains a higher percentage of fine and less dense particles than the parent soil on the cropland. This change is composition of eroded soil due to the selective nature of the process. Sudhira and Adeyemo (2003) the consequence of unprecedented development, human being is responsible for choking several lakes to death. Storm water runoff and discharge of sewage into rivers are two common ways that various nutrients enter the aquatic ecosystem resulting in the pollution of that system. Stronkhorst et.al (2004) the sediments form a natural buffer and filter system in the material cycles of waters. Sediments in our rivers is an important habitat as well as a main nutrient source for aquatic organism. Furthermore, sediments have an impact on

ecological quality or their quantity or both. Lokhande R.S., (2011) aquatic systems are subjected to strong variation of flow rate, substance input and transport and sedimentation. Sediment analysis is increasingly important in evaluating qualities of the total ecosystem of a body of water, in addition to the water sample analysis practiced for years. Gupta (2007) soil is a medium which crop grows to food and cloth. The word soil fertility is vital to a productive soil. Certain external factors control plant growth, air, temperature, light mechanical support, nutrient and water. Solanki and Chavda (2012) the soil is a natural body of mineral and organic material differentiated into horizons, which differ among themselves as well as from underlying material in their morphology, physical make-up, chemical composition and biological characteristics. Borkar (2015) soil is

mixture of minerals, organic matter, gases, liquids and myriad of micro and macro-organisms, that can support plant life. Soil as a general term usually denotes the unconsolidated thin, variable layer of mineral and organic material usually biologically active that covers rest of the earth land surface. Shukla (2010) anthropogenic activities often lead to contamination of water sources. Therefore, due to natural eutrophication of lakes and anthropogenic activity in lakes areas, many lakes worldwide become salty: they are decaying and turning into marsh. Robert *et.al.* (2011) calcareous lake sediments are more appropriate for soil liming; organic and siliceous sediments are suitable as a source of nutritious material. Alkan *et al.*, (2009) the most attention is given to mechanical cleaning, removal of sediments as fertilizers seems to be an interesting measure. Ali *et. al.*, (2014) only for a few river in the world and over a limited period, sediments concentration have been measured at a daily or shorter frequency. In order to determine sediments loads in the absence of these measurements, models and rating curves have been used. Knowing the total sediments load from river is essential for evaluating the siltation of reservoirs. Enter *et.al.*, (2008) the preservation of organic soil material is very important even if extensive agriculture is being carried on the

Physical-Chemical Parameter	Methods of analysis
1. Ph	:by digital pH meter
2.Electronic conductivity	:by digital conductivity meter
3. Organic matter	: by titration method

preservation of nutrient. Pujar *et. al.*, (2012) the type of soil is determined by the original parent rock from which the soil is formed by the action of different agents. Soil formation is a constructive as well as a destructive process.

## MATERIALS AND METHODS :

### Study Area:

#### 1) Manjari

Manjari village is located in Nandgaon Khandeshwar Tehsil of Amravati district in Maharashtra, India. It is situated 20km away from sub-district headquarter. Mund Nishankrao and 24km away from district headquarter Amravati. Amravati is nearest town to Manjari which is approximately 24km away. As per 2009 stats, Mahsla is the gram panchayat of Manjari village. The Lake has an area of 28 hectare and serves as sources of irrigation for about 50 hectare of land throughout 12 months of the year. Also, it provided jobs throughout the year for around 30-35 people from the surrounding fish village. The Lake is chief sources of irrigation for farmers in the nearby vicinity.

#### 2) Kondeshwar

Kondeshwar is famous for the temple of lord Shiva. The total driving Distance from Amravati to Kondeshwar Lake is 18.0 km. Kondeshwar Lake is getting dirty day by day. It has great hills lake which admires the real beauty of nature but because of anthropogenic activities like throwing dead animals inside the lake deteriorates the lake water quality. Kondeshwar Lake's water gets dirty as it is used for cleaning hands and washing clothes by the nearby locals.

### Sample Collection:

Samples from Manjari lake sediment and agricultural land near Manjarilakewere taken. Also samples from Kondeshwar lake sediment and agricultural land near Manjari lake were taken for study purpose.

### Physico-Chemical Analysis of Soil:

The analysis was carried out as per the Agricultural Standard method given below..

Primary Nutrient	Methods of analysis
4.Available Nitrogen	: by kjeldhal method
5.Available	: by spectro-

Phosphorus	photometer
6. Available potassium	: by flame photometer

Micronutrients	Methods of analysis
7. Copper	:by AAS method
8. Ferrous	:by AAS method
9. Zinc	:by AAS method
10. Manganese	:by AAS method

- The pH of soil sample was estimated by pH meter in the saturation paste (1:5 Suspensions)

### OBSERVATIONS AND RESULTS :

The area taken for observation is a lake under Manjarimhasla Lake sub division, Nandgaon Khandeshwar Main office Amravati.

The Lake is in kondeshwar, which is situated 18kms (11.18 miles) from Amravati. It takes around 20 minutes travel by road for reaching the Lake from Amravati. Kondeshwar has many business establishments. The Manjari Lake located in kondeshwar has an area of 28 hectare and serves as a source of irrigation for about 50 hectares of land throughout 12 months of the year for around 30-35 people from the surrounding Masoli village.

For aiding the farmers to get the water from the lake and distributing the same amongst them around 23 lakhs were planned to be sanctioned. Till now the money has not been provided to the farmers. But it is scheduled to be provided this year.

The enumerated Physico-chemical parameters as well as Primary nutrients, Micronutrient of all the samples are mention in table 4.1 to 4.2; the observations related to parameter are as follow:

#### Physical Parameter:

##### 1) pH

pH content of soil sample No.1 was found to be in the range of 8.07 to 8.10. The soil was Alkaline in nature Maximum pH was found 8.10

(Manjari Lake sediment) and Minimum pH was 8.07 (Manjari Agricultural Land). Ahe pH content of soil Samples No.II1-IV was found to be in the range are 8.34 to 8.62.

##### 2) Electronic Conductivity:

The conductivity content of soil samples No.I-II was found to be in the range of 0.31 to 0.36 m mho/cm. Maximum electronic conductivity was found 0.36 m mho/cm (Manjari Lake sediment) and minimum electronic conductivity was found 0.31 m mho/cm (Manjari agricultural land) And the conductivity content of soil sample No. III-IV was found to be in the range of 0.41 to 0.83 m mho/cm.

##### 3) Organic Carbon:

The organic carbon content of soil sample No.1-I was found to be in the range of 0.28 to 0.57%. Maximum Organic carbon organic carbon was found 0.57 % (Manjari lake sediment) and minimum organic carbon was found 0.28% (Kondeshwar Agricultural land). And the organic carbon content of soil sample No 1-TV was found to be range of 0.42 to 0.50%.

#### Primary nutrient:

##### 1) Available nitrogen:

The nitrogen content of soil sample No.1-II was found to be in the range of 196.0 kg/hect. to 399.0 kg/hect. Maximum available nitrogen was found to be 399.0 kg/hect. (Manjari lake sediment) and minimum available nitrogen was found to be 196.0 kg/hect. (Manjari agricultural land). And the nitrogen content of soil sample no. II1-IV was found to be in the range of 194.0 to 350.0 kg/hect.

##### 2) Available phosphor

The Available phosphorus content of soil sample No.I-II was found to be in the range of 17.31 to 17.37kg/hect. Maximum available phosphorus was found to be 17.37kg/hect. (Manjari Lake sediment) and minimum available phosphorus sample show to be 17.31kg/hect.(Manjari agricultural soil). And the available phosphorus content of soil sample

No.II-IV was found to be in the range of 17.05 to 27.47 kg/hect.

### 3) Available potassium:

The available potassium content of soil samples No.I-II was found to be in the range of 362.04 to 559.88 kg/hect. Maximum available potassium was found to be 559.88 kg/hect. (Manjari lake sediment) and minimum available sample show found to be 362.04kg/hect. (Manjari Agricultural soil). The Available potassium content of soil samples No.III-IV was found to be in the range of 443.48 to 504.1kg/hect.

### Micronutrients:

#### 1) Copper (Cu)

The copper content of soil sample No.-I was found to be in the range of 1.78 Ppm to 1.92 ppm. Maximum copper was found to be 1.92ppm. (Manjari Agricultural land) and minimum copper was found to be 1.78ppm (Manjari Lake sediment). The available copper content of soil sample No.III-IV was found to be in the range of 1.74ppm to 2.12ppm.

#### 2) Zinc (Zn)

The zinc content of soil sample No.-II was found to be in the range of 2.04ppm to 2.11ppm. Maximum copper was found to be 2.1 1ppm (Manjari agricultural soil). And minimum copper was found to be 2.04ppm (Manjari lake sediment). And the zinc content of soil sample No.II-IV was found to be in the range of 0.74ppm to 1.08ppm.

#### 3) Manganese (Mn)

The manganese content of soil sample No.I-II was found to be in the range of 2.36ppm to 2.98ppm. Maximum was found to be 2.98ppm (Manjari agricultural soil). and minimum manganese content was found to be 2.36ppm (Manjari lake sediment). And the manganese content in the soil samples No.III-IV was found to be in the range of 2.86ppm to 7.44ppm.

#### 4) Ferrous (Fe)

The ferrous content of soil sample No.I-II was found to be in the range of 2.22ppm to 3.02ppm.

Maximum ferrous was found to be 3.02ppm (Manjari agricultural soil) and minimum ferrous content was found to be 2.22ppm (Manjarilake sediment). And the ferrous content of soil sample No.III-IV was found to be in the range of 2.0ppm to 2.02ppm.

### CONCLUSION :

Samples of sediments of Kondeshwar Lake and agricultural land near Kondeshwar were taken. Also, samples of sediment of Kondeshwar Lake and agricultural land were taken for study purpose.

Finding of Research shows that level of pH, Conductivity, Organic carbon, N, P, K is comparatively more in Mnjari lake than agricultural land. This shows that Manjari lake sediments are more fertile than agricultural soil. Levels of three elements like Zn, Cu and Mn are comparatively more in soil sediments than agricultural land.

Levels of trace elements like Cu, Mn in Kondeshwar Lake is comparatively higher than agricultural land near Kondeshwar. This shows higher nutritional level than agricultural soil.

When comparing other soil parameters, it is concluded that agricultural soil is more fertile than sediments for Kondeshwar Lake.

From all the findings it is concluded that Manjari lake sediments can be used as fertilizer for improving soil quality of agricultural land. It will prove to be a helping hand for increasing the depth of lake and thereby reducing eutrophication. In case of Kondeshwar Lake, Lake Sediments are not that much useful for agricultural purpose as agricultural land near Kondeshwar Lake is more fertile than the Lake sediments, but it may be used for increasing the fertility of the bare areas in the vicinity of the Kondeshwar village.

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**Table 1: Parameters of Manjari Lake sediments and agricultural soil.**

Sr. No.	Parameter	Standards	Observation Of Manjari Lake Sediments (Sample-I)	Remarks	Observation of Manjari Agriculture Soil (Sample-II)	Remarks
1.	pH	7.1 to 7.5	8.10	Alkaline	8.07	Alkaline
2.	Electronic Conductivity	1.00	0.36	Normal	0.31	Normal
3.	Organic Carbon	0.41 to 0.60	0.57	Medium	0.28	Low
4.	Nitrogen	281 to 420	399.0	Medium	196.0	Low
5.	Phosphorous	31 to 50	17.37	Low	17.31	Low
6.	Potassium	181 to 240	559.88	Excessive Above std. Level	362.04	Excess above Std. Level
7.	Zinc	0.5 to 0.75	2.04	Above Limit	2.11	Above Limit
8.	Copper	1 to 1.5	1.78	Above Limit	1.92	Above Limit
9.	Manganese	7.5 to 10	2.36	Low	2.98	Low
10.	Ferrous	5 to 7.5	2.22	Low	3.02	Low

**Table 2 : Parameters of Kondeshwar lake sediments and agricultural soil**

Sr. No.	Parameter	Standards	Observations of Kondeshwar Lake Sediment (Sample-III)	Remark	Observation of Kondeshwar Agriculture Soil (Sample- IV)	Remark
1.	pH	7.1 to 7.5	8.62	Highly Alkaline	8.34	Alkaline
2.	Electronic Conductivity	1.00	0.83	Normal	0.41	Normal
3.	Organic Carbon	0.41 to 0.60	0.42	Medium	0.50	Medium
4.	Nitrogen	281 to 420	294.0	Medium	350.0	Medium
5.	Phosphorous	31 to 50	27.47	Low	17.05	Low
6.	Potassium	181 to 240	504.1	Excess above std.	443.48	Excess above std. level
7.	Zinc	0.5 to 0.75	0.74	Medium	1.08	Above std.
8.	Copper	1 to 1.5	2.12	Excess above std.	1.74	Above limit
9.	Manganese	7.5 to 10	7.44	Medium	2.86	Low
10.	Ferrous	5 to 7.5	2.0	Low	2.02	Low