SEDIMENTS ANALYSIS OF RAMALA LAKE IN CHANDRAPUR DISTRICT OF MAHARASHTRA, INDIA.

D. M. Gaidhane, M. Subhas and Pratibha S. Dhande

Department of Zoology, Janata Mahavidyalaya, Chandrapur-442401, Maharashtra, India

Email: dmgaidhane1969@gmail.com

ABSTRACT:

Ramala lake is an ancient lake in Chandrapur built by Gond Raja of Chandrapur for its domestic use of water. It is not a perennial lake as it dries during Summer season. Its sediments study was carried out for a period of 1 month (March, 2022) as a project work of our M.Sc. student. During the study period, physico-chemical parameters of soil was analyzed including Soil texture (sand, silt and clay), Moisture, soil pH, Electrical conductivity, Organic carbon, Calcium, Magnesium, and Calcium carbonate. The percentage of Sand was found 38%, Silt - 23.00%, Clay - 39%, moisture - 6.62%, pH - 7.5, Electrical conductivity - 0.18 ms, Organic carbon -0.41%, Calcium - 24.02 mg/l, Magnesium - 19.33 mg/l and $CaCO_3$ – 3.90 mg/l. From this study it may be conclude that, the sediments quality of Ramala lake is good and suitable for fish culture practices. Its waste water management is also important. For the conservation of Ramala lake, *Eichhornia* plants should be removed every year.

Keywords: - Sediments, Ramala lake, Chandrapur..

INTRODUCTION:

Soil is an important component or medium for the survival of living organisms including both terrestrial and aquatic. Soil is developed through the pedogenic processes such as weathering of rocks. The constituents of rock are organic and inorganic materials. They possess physical, chemical, biological and mineralogical properties having variability from depth to the surface of the earth and provides a medium for plants, animals and micro-organisms. The physico-chemical properties affect on the quality of soil and hence, its analysis is important.

India's inland water bodies are diverse as they are plentiful. These are important source of food and also provide employment to the rural peoples in India. India is the second largest producer of inland fishes. About 80% inland fishes and 20% capture fishes are produced in India. In India, water reservoirs have rich flora and fauna. Majority of reservoirs in India are not scientifically managed but only some half are heartedly managed and sometimes they are not managed too (Kumari S. *et al.*(2019). Lake soil plays important role in the production of fishes as it supplies essential nutrients to fishes and other aquatic organisms. The aquatic organic matter has a potential of energy and stored in the soil at the bottom of lake in the form of organic residue and humus which regulates the biota of lake. Physically, the lake soil composed of stones, plants roots, leaves, sand, silt, clay, shells of molluscs and humus. The presence and proportion of sand, silt and clay gives relative texture to the soil. Depending upon its predominance, the soil is said to be sandy, silty and clayee soil. The water retention capacity of soil is the ability to hold the water after filtration. The fertility of soil is depends upon the basic nutrients like N, P and K (Nitrogen, Phosphorus and Potassium) present in the soil. The soil is a mixture of abiotic components like minerals, organic matter and biotic components. The organic matter comprises residues of plants and animals. The abiotic components include sand,

silt and clay. The organic matter is present in the upper layer of soil which influence on the physico-chemical properties of soil (Gupte and Shaikh, 2014). The physico-chemical characteristics of bottom sediments of lake are also greatly influence by geological, regional and climatic factors.

In order to study the sediments of Ramala lake, a brief review of literature was done as follows: Gupte and Shaikh (2014) had made sediments analysis of Shelar lake in Bhiwandi, Maharashtra. It is a freshwater lake in which fishing is carried out. They found sand (35%), silt (25%) and clay (40%). Thus, the bottom soil was clayee-loam in its texture. The water retention capacity was 47% and indicating that lake is suitable for fish culture practices. Tale and Ingole (2015) had made a review of physico-chemical properties of soil quality. According to him, the physico-chemical parameters study of soil is very important as it directly affects on soil productivity. They had observed physico-chemical parameters like soil texture, soil pH, electrical conductivity, temperature, soil organic matter, available nitrogen, phosphorus and potassium. This knowledge creates the awareness among the farmers about the economic productivity. Gaidhane and Saksena (2007) was studied the sediments of kharland ponds of Ratnagiri with reference to prawn culture and was concluded that these ponds are suitable for the culture of prawns like *Macrobrachium rosenbergii*, a giant freshwater prawn and *Penaeous monodon*, a marine prawn separately or along with cultivable species of fishes.

Ghare and Kumbhar (2021) had made a study on physico-chemical parameters of soil sample of coastal line of Gujarat and concluded that, the properties of soil keeps on charging depending on various anthropological activities carried out nearby. The range in which values lie keeps on fluctuating, sometimes under range, sometimes totally beyond it. Through such studies, we endeavour to highlight the potential for hazardous impact that nature might face due to excessive anthropological activity. Kekane *et al.* (2015) was studied the physico-chemical properties of soil and stated that the soil productivity depends on physico-chemical parameters.

Ramala lake is very old lake in Chandrapur. It was excavated by Gond Raja before three hundred years for the domestic purpose. Now, it is polluted due to the anthropogenic activities such as drainage system, fishing, idols immersion, etc. Municipal Corporation of Chandrapur and NGO's has taken strict action against these activities. They also take help of Maharashtra Government for its saving beauty and utility. Ramala lake is not a perennial lake. It is seasonal lake as it dries during season and filled in rainy season. So, during Summer season, its sediments samples were collected and analyzed them in the laboratory for studying its physico-chemical properties with references to aquaculture practices, especially fisheries. Nobody was studied its sediments in the past. Therefore, this project had undertaken.

MATERIALS AND METHODS

Ramala lake is an ancient lake situated in the 'Heart of Chandrapur city' near Main Railway Station of Chandrapur. It is a seasonal lake as it dries partially during summer season. Weekly fishing is done in the lake throughout the year. The lake is useful for waste-water management of the city. Also uses for idols immersion during Ganpati and Durga festivals. It is using for aesthetics and tourist purpose too. Due to all these anthropogenic activities, its water quality becomes deteriorates. Satellite view of Ramala lake is showing in Plate 1, A view of Ramala lake during sampling time is showing in Plate 2 and Sediments collection at Ramala lake by researcher in Plate 3. Sampling was done during March, 2022 as a M.Sc. Project work and analyzed the samples in the laboratory by

following Standard methods (APHA, AWWA and WEF, 2005).

RESULT AND DISCUSSION

During the period of study, the following sediments parameters was observed including Sand, Silt, Clay, Moisture, pH, Electrical conductivity, Organic Carbon, Calcium, Magnesium, and Calcium carbonate. Their values are given in the Table 1.

The physico-chemical parameters of soil are important to know the tropic nature of the water body. Water bodies are generally of three types, viz., Oligotrophic, Mesotrophic and Eutrophic. Usually, mesotrophic water bodies are highly productive in nature (Kumari, S. *et al.* (2019). Ramala lake is a small lake used for waste water management and fishing purpose. Ramala lake is a pride of Chandrapur city also. Its physico-chemical parameters of soil are important from its productivity point of view. According to Sellassie and Ayanna (2013), the appropriate and integrated land management options for different land systems are required to sustain agriculture productivity while protecting the environment. Jharia and Raj (2014) was studied the effects of wildfires on flora, fauna and physico-chemical properties of soil. He observed that fire affected area showed reduction in species diversity both flora and fauna. Nazir *et al.* (2015) was studied the accumulation of heavy metals in soil, water and plants and analyzed physico-chemical parameters of soil and water from Tanda dam, Kohat and concluded that the heavy metals above their normal range are extremely threatened to both plants and animals life. Olorunifemi *et al.* (2018), was studied the soil physico-chemical properties of soil in the forest vegetative zone of Nigeria and suggested that, the proper utilization of land is essential for soil quality maintenance and sustainable agricultural development. Iram and Khan (2015) analyzed the soil quality by using physico-chemical parameters with special emphasis on Flouride from selected sites of Sawai

Madhopur Tehsil, Rajasthan. The result of this study reveals that, the values of percentages of physico-chemical study of soil are important to agricultural chemists for plants growth and soil management.

Ghode *et al.* (2020) had studied the relationship between soil physico-chemical properties, available macro- and micro-nutrients and yield in cotton growing soil of Nanded district of Maharashtra. Their studies showed that, among soil properties, yield of cotton showed positive relationship with organic carbon while positive and significant relationship with soil depth and clay and negative relationship with silt, pH and electrical conductivity but negative and significant relationship with sand and $CaCO_3$. Babur *et al.* (2021) reported that soil-erosion make effect on physico-chemical properties of soil and different land use types. The changes of land use and land cover associated with organic matter content can alter the soil enzyme activities within the soil profile (Kizilkaya and Dengiz, 2010). Dandawate (2020) was analyzed the soil samples for its physico-chemical parameters from Sangamner city of Maharashtra. They found that soil pH ranged between 7.60 to 8.81, Electrical conductivity from 0.50 to 0.73 dSm^{-1}, Organic Carbon 0.52 to 0.72%, Available Nitrogen was found to be 140.01 to 252.68 Kg/ha, etc. In the present study, Sand was found 38%, Silt 23.00%, Clay 39.00, Moisture 6.62%, pH was 7.5, i.e., alkaline pH, Electrical conductivity 0.48 ms, Organic Carbon 0.41%, Calcium was 24.02 mg/l, Magnesium 19.33 mg/l and Calcium Carbonate 3.90 (mg/l). These parameters show that the Ramala lake is productive and suitable for fisheries activities. Raman and Sathiyanarayanan (2009) was analyzed the sediments of Chennai city and recommended that the suitable soil quality management is essential to avail any further contaminations. Chaudhari (2013) was studied the sediments of eight selected places in Bhusawal. This study gives information

about the nature of soil, present nutrients in soil, etc. According to this information, farmers can arrange the amount of which fertilizers and nutrients needed to the soil for increase the percentage of yield of crops. Garcia-Ruiz *et al.* (2009) was suggested that soil enzymes and nematode community indices are the indicators of changes in soil quality under contrasting management practices. Also they analyzed the selected physico-chemical parameters of soil which helps for the improvement of soil quality.

CONCLUSION:

From the above study, it may be conclude that -

1. Sediments quality of Ramala lake is good and may utilize for fish culture practices.
2. Waste management of Ramala lake is important for the improvement of quality of sediments and water.
3. Every year Ramala lake occupies with *Eichhornia* plants. Its removal is important for the conservation of aquatic biodiversity.

Conflict of interest

Author declares no conflict of interest about the present study.

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Plate 1. Satellite view of Ramala lake.

Plate 2. A view of Ramala lake during sampling time.

Plate 3. Sediments Collection at Ramala lake.

Table 1. Sediments parameters of Ramala lake.

Sr. No.	Sediments parameters	Analyzed value
1	Sand (%)	38.00
2	Silt (%)	23.00
3	Clay (%)	39.00
4	Moisture (%)	6.62
5	pH	7.5
6	Electrical conductivity (ms)	0.48
7	Organic carbon (%)	0.41
8	Calcium (mg/l)	24.02
9	Magnesium (mg/l)	19.33
10	Calcium carbonate (mg/l)	3.90