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Analysis of Various Physico-Chemical Factors of Gang Canal Near Sri Ganganagar (Rajasthan)

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Abstract - The present study describes the water quality of Gang Canal near Sri Ganganagar city. The result of this study efforts were made to evaluate the chemicalcharacteristics of Gang canal. The Water samples were analyzed for pH, hardness, and dissolved O, which are essential parameters for human and animalconsumption. The average value of Hardness is 150 mg/l which indicates that itis slightly hard water. The value of Do is 10.8 which represent good,concentration in water for respiration needed by living organisms. The averagevalue of pH recorded in Gang canal is 8.5 which decides that water is basic innature. So we concluded that Gang Canal water is suitable for agriculture and fish production.

Keyword - Hardness, pH, Water, Agriculture, D.O

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INTRODUCTION

Civilization arose along the banks of the rivers, lakes and coastalstretches where the food security and water security were assured. The riversand streams are the major features on any landscape. River streams & canal thatflow over a sloping surface in a definite direction constitute the lotic system in afresh water environment. During the 20th century, scientific and technologicaladvancement coupled with population explosion and change in life style hasresulted in exerting enormous pressure on natural ecosystem and resources.With increasing population and economic development the waterrequirements grew rapidly and storage reservoirs then became the most effectivetools for eliminating the discrepancies of water availability in time and space. Inthe present day the reservoirs and used for multipurpose like flood control, generation of hydro electricity, drinking water supply irrigations, fishery and manymore uses, Irrigation is a major purposes for building up dams A complicatednetwork of supply of channels is laid-out from the dam to the surrounding areadepending the amount of water available. The canal thus is akin to the riveremanating from lakes. The contribute to the maintenance of depth and basinstructure of the lake by removing the suspended load.Characteristics required for irrigation water one also specific. Theirrigation water often brings in logging, solanity and alkalinity problems. It is, therefore, very important to know the quality of irrigation water so as to gaugethe possible effects of this water on the soil;. The chemical characteristics ofirrigation water is more or less those required for fishery waters.

SITE DESCRIPTION

The study area (Gang Canal) is located in the district Ganganagar inthe desert north western part of the state of Rajasthan (Lat 29" - 08' to 30" - 12'longitude 73" - 05' to 73" - 58") The canal system is brought to this region fromPunjab and at present irrigates extensive tracts of this otherwise desert region.The Ganga Canal brought from the river Satluj is the precursor of the present Indira Gandhi Canal. This Gang Canal was built by Maharaja Ganga Singh of theerstwhile princely State of Bikaner in the year 1927. The canal flows almostthroughout the year carrying water to these inhabitants of the area for their domesticand agricultural use. The morphometric features of Gang Canal are given in thetable.

Morphometric features of Gang Canal

Latitude29° - 08' to 30° - 12'Longitude73" - 05' to 739 - 58'Attitude550 m (above mean sea level) Total length of Gang Canal (Bikaner Canal) 129 Km. (all lined) Length of Gang Canal feeder73 Km (all unlined)Width (of Gang Canal feeder)90 ft. Full Supply depth of Gang Canal feeder7 Ft.Full Supply discharge of Gang Canal feeder1450 cusec.

REAGENTS AND STANDARD

Analytical reagent grade were used throughout the study without any further purification. To prepare all the reagents and calibrations standardsdesirable glass distilled water was used. The metal standards,

double glass distilledwater was used. The metal standards were prepared from stock solution of 1000mg/It by successive dilution with ultra pure water. Deionised water was used throughout the study. The glassware were washed with nitric acid (1:5) followedby several portions to distilled water.All the experiments were carried out in duplication.

WATER SAMPLING

Water samples were collected in pre-cleaned and sterilized polyethylenebottles of one liter capacity. The sampling was done between 9-11 am and watersample were collected from middle of the canal. The samples were taken byholding the bottle at the bottom to avoid any contamination. The samples werebrought to the laboratory and immediately tested for dissolved O, and B.O.D.Other selected parameters were measured within 6-12 hrs of collection of samples.The sampling was done two times from the same site each after one fortnightinterval.The pH, total hardness, total alkalinity, chloride, dissolved oxygen, B.O.D. (biological oxygen demand), and free CO, of water samples was analyzed by following standards.

Table 1: Various Physico-chemical parameters

S.No.	Month	Parameters								
		PH	DO	CO_2	Hardness	Alkalinity	Chloride	BOD	Acidity	TDS
1	August	8.18	2.1	6	178	28	36.4	10.12	25	320
2	September-I	8.27	3.2	8	124	50	15.62	3.04	20	260
3	September-II	8.18	9.6	10	146	84	15.62	8.76	15	280
4	October-I	8.55	8.8	8	144	84	35.5	8	20	880
5	October-II	8.62	10.8	10	194	64	26.9	9.84	20	680
6	November	8.2	5.6	4	128	68	18.46	5.16	40	300
7	December-I	8.68	10.4	8	114	60	25.56	9.52	45	230
8	December-II	8.44	14	12	114	54	18.46	1.95	45	280
9	January	8.6	11.8	14	108	52	32.66	3.8	30	240

RESULT AND DISCUSSIONS

The chemical nature of running water varies from region to region. Inthese variations, there is always a reflection of the local geography and climateThe biota of the water also exerts selective effect on many dissolved substances. Given below is the discussion of the chemical structure of the GangCanal in relation to the similar studies elsewhere in the world.

pH

Drusilla et al (2004) have recorded pH from 7.15 - 3.0 in courtllum (Tamil Nadu) . In present study High value of pH is recorded in winter (Dec)8.68 and lower in monsoon - 8.18. The lower value of pH during July may be attributed to heavy rainfall during themonth.It is clear from the observation that the season had a great influence on Ph. The pH showed a direct relationship with alkalinity.

TDS

TDS consists of diff. kinds of nutrients and minerals. High concentration ofdissolved solids of irrigation water increases the salinity of soil.The pollution has direct relationship Dissolved solids. In present study maxim value was recorded in Monsoon 320 mg/l (Aug) and minimum value was recorded in Winter -230 mg/l (Dec.). High value in Monsoon was due to high turbidity and high value of Sedimentloads. Sunpriya et al (2010) have recorded TDS from 72-169 in river Kuakhai (Odisha).

Chlorinity

There is a direct correlation b/w chloride concentration and pollution chlorideis present in fresh water and in high abundance in all marine and coastal waters.In Gang Canal, High value of chlorinity occur in summer i.e. 36.40(July), which can be attributed to consequent decrease in volume of water, due tothe camel intake, bathing, and mixing of cattle excreta.

Low value in Rainy Season (September) 15.62 mg/l. Decrease inconcentration of chloride in rainy season might have been caused by the dilution due to rain.

BOD

BOD is the measure of the amount of oxygen, required by bacteria and other micro-organisms while stabilizing decomposable organic matter. High value of BOD indicates the organic pollution.In Present study Maximum value10.12mg/l of BOD is reported in monsoon (Aug.). Minimum value of BOD is1.95 mg/l in winter (Dec.).Due to increase in Bacterial growth, O, demand increases, organic matter increasesin rainy season.

Hardness

Hardness is mainly due to (P) of carbonates and bicarbonates of Ca andMgions.In present study lowest value of Hardness obtained in January (108 mg/l) and highest value of hardness is obtained in August(198 mg/l.). This is attributed to high temperature and low water level and addition of Mg & Casalts from detergents and soaps used for clothes washing by surrounding villages. Ikbal Hussain et al (2004) have recorded Total Hardness from 690-1940 in riverKothari (Rajasthan)

Dissolved Oxygen (D.O.)

The dissolved oxygen is one of the important parameter in water-qualityassessment.Cold water holds more oxygen, than warm and salty water.DOhave beenfundamental requirement of life for plants and animal population in every waterbody.In present study, Minimum Value was recorded in August month (2.1 mg/l.). This is due to impart of turbid water. Maximum value of DO was recorded (11.8mg/l in January. This was due to moderate temperature and Productivity.

Total Alkalinity

Maximum value of total alkalinity was recorded in October month (84 mg/l) due to increased rate of decomposition and minimum value was recordedin August 28 mg/l. This is due to rain causing dilution of water. Ghosh and Sharma et al (1988) reported maxim alkalinity as 210 mg/l.in river, Ganga.

CONCLUSION

From the above analysis, it was found that in the water sample taken from the Gang Canal of Sri Ganganagar city of Rajasthan; all the parameters show more or less fluctuations during different seasons of the year. The outcome average value of Hardness, dissolved oxygen and pH showed that Gang Canal water is suitable for agriculture and fish production.

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