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PHYSICOCHEMICAL STUDIES ON IMPACT OF ARPA RIVER CHECK DAMS ON THE MICROENVIRONMENT OF DISTRICT BILASPUR, CHHATTISGARH

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ABSTRACT:
Bilaspur is the second largest city of Chhattisgarh state and Arpa River is the lifeline of this district. It originated from the forest area of Khondari-Khongsara in Maikal hill range of Bilaspur. The Arpa river is about 147 km. long. The River Arpa is a major tributary of the River Shivnath that meets near Matiyari village (Bilha Tehsil) of Bilaspur district. Shivnath that meets with River Mahanadi in central India. The river Arpa has a catchment area of about 2022 sq.km. Arpa river is one of the strongholds of district and thus it is indeed a lifeline of Bilaspur. More than 10 check dams (Khondari, Belgahna, Lachhanpur, Rapta, Torwa, Darrighat, Sherwani, Kaneri, Mangla etc.) have been constructed on this river[1]. These check dams were constructed to overcome the problem of irrigation and for human welfare. But due to reduction in water level these check dams have become a danger to livelihood. Maximum part of rain water gets stored in these check dams as a result little water reaches to Bilaspur city. In this way microenvironment of Bilaspur city is adversely affected. Sincere efforts needed to manage these check dams.

Keywords: River Arpa, Check Dams, Livelihood, Bilaspur, Chhattisgarh.

INTRODUCTION:

Bilaspur is the second largest city of Chhattisgarh. The total area of Bilaspur is about 6377 sq.km. The maximum temperature of Bilaspur is 45^0C.The hottest months are May and June. The minimum temperature is observed in the months of December and January. July and August are the heaviest rainfall months. The average rainfall is 1351 mm. Rivers around Bilaspur are Agaar, Maniyaar, and Arpa. Arpa is the lifeline of Bilaspur. It originated from Khondari-Khongsara (Pendra Tehsil) and flows to Sheonath river at Thakur deva near Bartori. Sheonath river in turn meets the Mahanadi. There are about 10-15 tributaries of river Arpa. The important ones are Maliniya nallah, Phoolwari nadi, Mati nallah, Madob nallah, Jawas nallah, Sakari nallah, Sat nallah,Gahila nallah, Chapi nallah, Kharang river and Gudguda nallah.The river Kharang is the main tributary of Arpa river[2]. The length of Arpa is about 147 km and average water flow is 400m. The total catchment area of this river is about 2022 sq. km. More than 10 check dams (Khondari, Belgahna, Lachhanpur, Rapta, Torwa, Darrighat, Sherwani, Kaneri, Mangla etc.) have been constructed on this river to mitigate the problem of irrigation. The present study is for investigation of effects of check dams on the microenvironment of Bilaspur.

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MATERIALS AND METHODS:

The primary and secondary data were collected. The primary data were collected from eye views and interviews of villagers who are settled on the bank of the Arpa River. The secondary data were collected from scientific journals, agriculture department, revenue department, forest department and irrigation department at the tehsil and district level. The information was collected by random sampling[3]. The data were collected on different aspects like water status, decreasing water level, dependency of human and livestock population.

RESULTS AND DISCUSSION:

The results of the present study on different aspects are discussed below:

ORIGIN OF ARPA RIVER:

Arpa river has its origin from the forest area of Khondri-Khongsara in Maikal hill,at Pendra tehsil in Bilaspur district. The length of Arpa river is about 147 km and average water flow is 400 m. River catchment area is 2022 sq.km.The water flows from north-west to south direction.

FIG:1 ORIGIN OF ARPA , VILLAGE KHODRI (TEHSIL PENDRA)[5]

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TRIBUTARIES OF ARPA RIVER:

There are about 10-15 tributaries of Arpa river are Maliniya nallah, Phoolwari nadi, Mati nallah, Madob nallah, Jawas nallah, Sakari nallah, Sat nallah, Gahila nallah, Chapi nallah, Kharang river and Gudguda nallah. The river Kharang is the main tributary[4].

Table 1: Important features of Arpa River

Origin	Khondari-Khngsara, Pendra
Length	147 km.
Width	400 m.
Depth	7-8 m.
Catchment area	2022 sq.km.
Tributaries	10-15
Temperature	15-45^{0}C
Climate	Subtropical
Average rainfall	1351 mm

WATER AVAILABILITY:

Arpa is dependent on rain water. During the rainy season water level rises up and in summer moves down. The river bank is sandy. About 10 check dams have been constructed on this river. Water is stored in these check dams for irrigation purposes. The maximum amount of rain water is stored in these check dams and is used by the local people. As a result little water reaches Bilaspur. Water availability is better in the southern part than the northern part. Due to the continuous deforestation, increasing population and climatic changes, the water level of Arpa River has gone down and drought has been generated.

USE OF ARPA WATER FOR IRRIGATION:

Bilaspur region is one of the top paddy producing regions in Chhattisgarh in the kharif season. The crop is dominated by pulses. Alluvial soil from Arpa river is responsible for making the region productive. Arpa with many check dams play an important role in irrigation.

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Fig :2 Check Dams(Mangla) and (Rapta) are constructed on Arpa River

WATER QUALITY:

The water quality of Arpa River with respect to pH ranges from 7.6-8.2. The DO value varies from 6.4 - 7.0mg/L. The BOD ranges from 2.6-4.0mg/L. The highest value of BOD was recorded at Belgahna. The concentration of Nitrate ranges from 1.08-1.42mg/L and the concentration of Nitrite ranges from 0.04-06 mg/L. The average value of conductivity is 495 µmhos/cm[7].

Table 2: Water quality of Arpa River

Parameters	Min	Max	Mean
Temperature, ^{0}C	15	45	30
BOD(mg/L)	2.6	4.0	3.3
pH	7.6	8.2	7.9
Conductivity (µmhos/cm)	168	822	495
DO (mg/L)	6.4	7.0	6.7

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Nitrate (mg/L)	1.08	1.42	1.25
Nitrite (mg/L)	0.04	0.06	0.05
Ammonia (MNP/100mL)	1.38	1.52	1.45
Coliform (MNP/100mL)	91	189	185

EFFECTS OF ARPA RIVER ON THE ENVIRONMENT OF BILASPUR CITY:

Bilaspur is situated on the bank of Arpa**.** People of Bilaspur are dependent on Arpa river. In the earlier times flood was the major problem. In 1974 first check dam built this river near Belgahna by the government. It was not sufficient to stop the flood water so many check dams have been constructed between Belgahana and Bilaspur to stop the flood water. This water is used in agriculture purposes. Due to continuous deforestation, climatic changes and increasing population water level of Arpa has gone down and drought has been generated[6]. Bilaspur city faces water problem except rainy seasons. Fertilizers and pesticides used by the farmers washed by rain and go to the river. Concentration of nitrate and phosphate in this water increases. Due to growth of algae called eutrophication, leads to pollution.

REFERENCES

1. Bhat, S. J. A., Geelani, S.M. (2013). Studies on Natural Resources and their significance around Arpa River basin in Chhattisgarh. Nature Environment and pollution and technology, 12(2): 309-313.

2. Bhat, S. J. A., Geelani, S.M. (2013). Studies on the Impact of Arpa River Check Dams on the Microenvironment of District Bilaspur Chhattisgarh 12(1): 135-138.

3. Tewari, U., Bahadur, A.N., Soni, P., Pandey, S.(2014). Physicochemical characterization of city sewage discharged into river Arpa at Bilaspur, India. Indian Journal of Life Sciences, 4(1): 31+.

4. Bilaspur Govt. (2019). Bilaspur District Chhattisgarh Govt. website.https://bilaspur.gov.in/en/

5. Bilaspur Nagar Nigam (2020). Hostory of Bilaspur city: Origin and development. https://bilaspurnagarnigam.com/history.php

6. Halder B., Bandyopadhyay J. (2021). Evaluating the Impact of Climate change on urban environment using geospatial technologies in the planning area of Bilaspur, India Environmental Challenges, 5: 100286.https://doi.org/10.1080/15715124.2021.2016780

7. Soni P., Singh P. R. (2022). A water quality assessment of Arpa River under Bilapsur Arpa Basin area, of Chhattisgarh state. Intl. J. River Basin Management.