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## A GEOGRAPHICAL ANALYSIS OF DRINKING WATER SOURCES IN KUMBHI RIVER BASIN, MAHARASHTRA STATE

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### **ABSTRACT:**

Water is a basic resource for human beings and other living organism. The development and survival of various elements on the surface depends on water. Water controls the formation of the biosphere. The people of the earth still do not have access to water. Improved services are needed in rural areas and providing safe water to all is a major challenge. The objective of this study is to assess the spatio-temporal distribution of sources of water in Kumbhi river basin. Information on the source of drinking water in the village in the Kumbhi Basin is obtained from the district census handbook. Tables have been prepared by classifying the sources of drinking water in the village. Out of the total available water resources, all the water sources are available in Sangrul, Keloshi Khurd and Sangshi. Only one source of drinking water is available in Upawade, Narveli, Taliye Kh. villages. Out of 103 villages in Kumbhi river basin, 17 villages still do not have access to tap water.

**Keywords:** *Drinking water, Tap water, Treated water, Sources of water*

### **INTRODUCTION:**

Water is the most abundant element on earth surface. About 2.5% of the earth surface water is fresh water, and 97.5% is saline. The interior of the earth contains 31 percent fresh water in the form of moisture. While 69 percent of freshwater is in frozen form in the glaciers of Antarctica and Greenland. A Human need to freshwater. (Parmeshwar, 2014) Water is an essential resource for human beings and other living organism. The development and survival of various elements on the surface depends on water. Water controls the formation of the

biosphere. Water is used for agriculture, industry, transportation, domestic recreation and environmental processing. Demand of water for growing industries and agriculture is increasing. Globally, approximately 70% of water is used for irrigation, 22% for industrial use and 8% for domestic use.(Nayab, 2019)

The people of the earth still do not have available Water storage, 79% of them are rural residents. Improved water sources are needed in rural areas and providing safe water to all is a major challenge. Basic water availability has increased from 81% to 89% between 2000 and 2015.(Omarova, 2019)Giving tap water to houses will reduce water collection time and raise living standards.(Chen)The availability of pure drinking water to people with tap water reduces the risk of diarrhea.(Wilbers, 2021)Due to mistrust in public water supply, a large number of people use bottled water or processed water. Bottled water costs 500 times more than tap water. In order to save family produce, it is necessary to create awareness about the quality of tap water.(Dindarloo, 2015)Understanding the source of tap water supply is important for sustainable management of water resources because seasonal variation can now pose many risks to water resources. (Wet R. , 2020)

### **OBJECTIVES:**

1. To assess the spatio-temporal distribution of sources of water in Kumbhi river basin

### **DATA SOURCE & METHODOLOGY:**

The Arc Swat model in the Arc GIS software is used to demarcate the Kumbhi river basin. Cartosat DEM data is used for this. Villages in the Kumbhi river basin have been identified after demarcation. Information on the source of drinking water in the village in the Kumbhi Basin is obtained from the district census handbook. Tables have been prepared by classifying the sources of drinking water in the village.

### **STUDY REGION:**

The study region selected for present study is Kumbhi river basin. The Panchganga River in Kolhapur district is confluence of five rivers, the Kumbhi

River being one of them. Kumbhi River is a tributary of Panchganga River. The river Kumbhi originates in Gaganbawda taluka in Lakhmapur village and flows from north to west through Panhala, Gaganbawda, Radhanagari and Karveer. The latitudinal extent of Kumbhi river basin is  $16^{\circ} 24' 52''$  N to  $16^{\circ} 44' 3''$  N and longitudinal extent is  $73^{\circ} 49' 31''$  E to  $74^{\circ} 7' 15''$  E. The Kumbhi river basin covers an area of 511 sq. km. (Figure 1)

## **RESULT & DISCUSSION:**

### **A. Sources of Water:**

Table number 1 shows that, uncovered well water resources are available in large quantities in the villages in Kumbhi river basin. Although uncovered well appears is high in quantity, so it is widely used for agriculture also. After uncovered well large number of villages having tap water, river and canal water sources. These sources are used extensively for drinking purpose. Due to the hilly topography and high rainfall there are number of springs in many villages of Kumbhi river basin. The diverse sources of water resources are available in the Kumbhi river basin which gives opportunities to many industries along with agriculture development. This area is considered to be dominant in terms of water availability. (Table No.1)

### **B. Temporal Distribution of Tap Water:**

In 1981 tap water facility was made available in 5 villages. In 1991, this number increased and tap water facility became available in 46 villages. Also in 2001 and 2011 this number increased and tap water facility became available in 73 and 86 villages respectively. On the other hand this facility has been extended from house to house due to the government efforts, which shows the development in tap water from 1961 to 2011. This source of water saves time of the people and also provides safe and good quality water as compare to previous source of water. (Table 2) As per 2011 census, there is no source of tap water for drinking water in Upawade, Shenavade, Sakhari, Mhalunge, Kirave, Mutakeshwar, Khadule, Longhe, Tisangi, Mandukali, Kherivade, Sheloshi, Jargi, Kadave, Narveli, Taliye Kh., and Konoli Tarf Asandoli.

**Table 1: Sources of Water in Kumbhi River Basin (2011)**

Water sources	Number of Villages								
	Tap Water-Treated	Tap Water Untreated	Covered Well	Uncovered Well	Hand Pump	Tube Wells/Bore hole	Spring	River /Canal	Tank/Pond/Lake
Tap Water-Treated	86	3	11	84	49	16	29	59	15
Tap Water Untreated	3	17	1	17	3	4	17	15	0
Covered Well	11	1	11	11	7	6	4	6	3
Uncovered Well	84	17	11	101	48	18	42	71	14
Hand Pump	49	3	7	48	50	10	16	38	10
Tube Wells/Borehole	16	4	6	18	10	18	10	12	3
Spring	29	71	4	42	16	10	43	35	7
River/Canal	59	15	6	71	38	12	35	72	10
Tank/Pond/Lake	15	0	3	14	10	3	7	10	15

*Source: District Census handbook, Kolhapur 2011*

**Table 2: Temporal Distribution of Tap Water in Kumbhi River Basin (1961-2011)**

Year	1961	1971	1981	1991	2001	2011
No. of villages	0	0	5	46	73	86
% of villages	0	0	4.85	44.66	70.87	83.49

*Source: District Census handbook, Kolhapur*

### C. Treated and Untreated water sources:

Drinking water from tap water, covered well is from improved source and drinking water from uncovered well, river, canal, pond, lake, unprotected borehole is from unimproved source. Drinking water is supplied through tap water in 86 villages in Kumbhi river basin, out of which drinking water is distributed through tap water in 75 villages in summer months and in 73 villages throughout the year. At the same time, drinking water is supplied by

processing water from wells in only 11 villages. The processed water is distributed throughout the year on covered well water from 11 villages namely ChinchawadeTarf Kale, KalambeTarf Kale, Adur, Koparde, Kuditre, Dhondewadi, Sangrul, Khatangale, Amashi, Keloshi Bk., Padali. (Table 3)

**Table 3: Treated and Untreated water sources in Kumbhi River Basin: 2011**

Sources	Tap Water- Treated Functioning in Summer months	Tap Water- Treated Functioning All round the year	Total
Tap Water Treated	75 (87.20%)	73 (84.88%)	86
Tap Water Untreated	16 (94.11%)	16 (94.11%)	17
Covered Well	11 (100%)	11 (100%)	11
Uncovered Well	100 (99%)	98 (97%)	101

Note: Figures in brackets show percentages

*Source: District Census Handbook, Kolhapur 2011*

#### D. Number of water sources:

The Kumbhi river basin is rich in water resources. Based on the data source the availability of water resources varies from village to village. In 103 villages of Kumbhi river basin, tap Water, covered well, hand pump, tube wells, spring, river, tank etc. drinking water sources are available. Out of all villages, 3 drinking water sources are available in 28 villages, 5 in 27 villages and 4 in 26 villages. Out of the total available water resources, all the water sources are available in Sangrul, KeloshiKhurd and Sangshi. There is only one source of drinking water available in Upawade, Narveli, TaliyeKh. villages. (Table 4)

**Table 4: Number of water sources in Kumbhi River Basin (2011)**

No. of sources	1	2	3	4	5	6	7	Total
No. of Villages	3	12	28	26	27	4	3	103
% of Villages	2.91	11.65	27.18	25.24	26.21	3.88	2.91	100

*Source: District Census Handbook, Kolhapur 2011*

**CONCLUSION:**

- Out of the total available water resources, all the water sources are available in Sangrul, KeloshiKhurd and Sangshi. Only one source of drinking water available in Upawade, Narveli, TaliyeKh. villages.
- Due to the hilly topography and high rainfall there are number of springs in many villages of Kumbhi river basin.
- Uncovered well water resources are available in large quantities in the villages in Kumbhi river basin
- Out of 103 villages in Kumbhi river basin, 17 villages still do not have access to tap water.

**SUGGESTION:**

- In villages where more than one source of drinking water is available, water from all sources should be collected, processed and distributed.
- Although there are various sources of drinking water available in the village in the Kumbhi river basin, it is necessary to supply pure drinking water by treating the water considering the good health of the citizens.
- Drinking water needs to be made available through tap water in 17 villages in the Kumbhi river basin.
- Citizens should make maximum use of improved drinking water source such as tap water and covered well.

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Figure 1: Kumbhi River Basin