



---

## A GEOGRAPHICAL ANALYSIS OF POTENTIALITY OF WATER IN SOLAPUR DISTRICT

---

**DR. NAYAB Z.A.**

Assistant Professor,

Geography Department,

UES. Mahila Mahavidyalaya, Solapur

---

### **Abstract**

Water is singly the most important element to the world as a whole. It is the life blood of the environment essential to the survival of all living things, whether it is plant, an animal or humans. All the human activities use fresh water. 97% water on the earth is salty and only 3% is fresh water. (Dr. Pawan Kumar 2014). The world's supply of clean, fresh water is steadily decreasing. World's available fresh water is not distributed uniformly aerielly and throughout the season or from year to year. Availability of water for consumption getting scarce day by day due to various activities of man. Today huge amount of water is required due to large number of total population and development in agriculture, industries etc. Hence attempt has made in this article to study the availability, potentiality of water in Solapur district.

**Key words** – Environment, availability, consumption, potentiality.

### **Introduction -**

Water on the earth is found in different forms. Its major portion is distributed in saline form in seas and ocean, whereas fresh water is available in a small quantity. Water vapour is an important part of the atmosphere which plays an important role in the energy circle. Water resources are found in the forms of solid (ice), liquid (water) and vapour (gaseous form) and found in seas and oceans, under the ground (groundwater) and on the surface of earth (surface water). Out of these ground and surface water are only useful for drinking, agriculture and industries etc. According to Indian standard 135 liters of water is required for per person per day. But the water is not available as required quantity. So the people are suffering from shortage of water. The storage of water from the rainfall by adopting different methods are very necessary, e.g. through rainwater harvesting, increase the input to a sub-surface water source by building reservoirs or detention ponds.

In short available fresh water which can be usable to human being and other living beings is only 0.02%.i.e. very very small quantity of water is available on earth for human and other living beings. Hence it should be used very economically and in pure form. Otherwise shortage of fresh water will

create very acute problems on the earth. The research article focuses the availability and potentiality of water in Solapur district.

### Objectives -

- 1- To study the water resources in Solapur.
- 2- To study the availability of water in Solapur.
- 3- To study the potentiality of drinking water in Solapur.

### Research Methodology-

The present study based on primary and secondary data. The data collected from irrigation department, the municipal Corporation and socio economic abstract of Solapur District. The information is also collected from interview and daily newspapers.

### Study Area-

Solapur district is situated in eastern part of western Maharashtra and south eastern part of Maharashtra. It is extended from  $17^{\circ} 10'$  N to  $18^{\circ} 32'$  North latitude and  $74^{\circ} 42'$  east to  $76^{\circ} 15'$  east longitude. The total geographical area of the district is 14895 sq. Kms. From the administrative point of view, it is divided into 3 sub-divisions namely Solapur, Pandharpur and Madha. The district is divided into 11 Talukas and 1142 villages.

Solapur district is bounded by Ahmednagar in the north, Osmanabad to east, the border of Karnataka and Sangli to the south, Satara and Pune district to the west.



### Results and Discussion-

Water can be available through different modes and means. The main source of water i.e. water is available directly from the rainfall, the surface run-off as well as from groundwater. Availability of groundwater and surface water is totally depending upon the amount of rainfall in any region. Generally, in low rainfall area the surface water and groundwater availability is low and in high

rainfall areas the surface water and ground water availability is more, but it also depends on number of factors like slope, rock type etc.

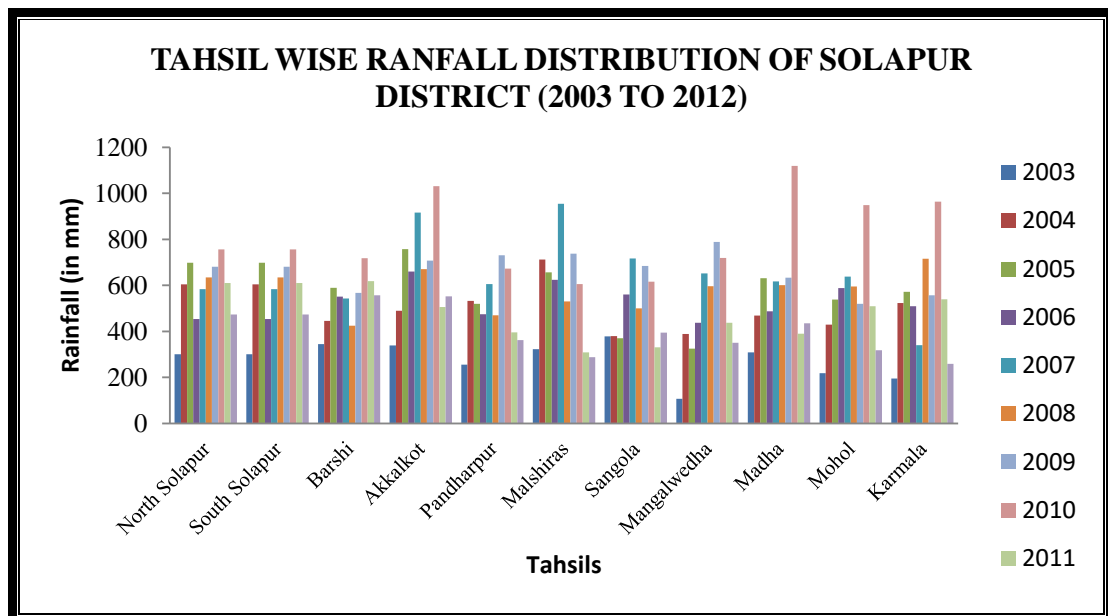
Solapur district receives water through two main sources.

- **Natural Sources**
- **Artificial Sources**

#### **Natural Sources**

Rainfall is the important natural source of water in the district. On an average the Solapur district receives 550 mm rainfall per year. But the availability of rainfall varies from year to year. The availability of water through rainfall is shown in the table. ( Table 1).

The rainfall data supplied by the IMD ( Indian Meteorological Department ) is the average for last 10 years and the average rainfall is calculated for all the tahsils in Solapur district. It is observed that in the district minimum average annual rainfall in last 10 years is 479 mm. While maximum average rainfall is 662 mm in Akkalkot tahsil. The eastern part of the district i.e. North Solapur, South Solapur and Akkalkot, the average annual rainfall ranges between 579 mm to 650 mm. In the western part (Malshiras) receives average annual rainfall is 584 mm and the southern part (Sangola) receives average annual rainfall 492 mm.



The graph shows that rainfall is high in the year 2010. i.e. the average rainfall is 809 mm. and the rainfall is less in the year 2003 i.e. the average rainfall is 278 mm.

The data also shows that last 3 to 4 years, the average annual rainfall is 470 mm which is low as compare to requirement. Hence the Solapur district suffers from the shortage of water. So the drought condition occurs frequently. in Solapur district.

### Artificial Source of Water

Apart from rainfall the water is also made available from artificial sources like dams, canals etc. One of the important artificial source of water is Bhima Ujani Project. Besides this water is also available from Nira Right Bank Canal, Sina Kolegaon Project and Kukdi Project from other districts.

**Table No. 1**

Availability of water through dam for Solapur District (water in million cubic metre )

Sr. No	Name of the Project	Storage Capacity	Water for Solapur
1	BhimaUjani Project	3320	1396.53
2	Nira Right Bank Canal	726.46	86.06
3	SinaKolegaon Project	150.49	1.46
4	Kukdi Project	1037.6	1.6
	Total		1485.65

Source: Compiled by researcher

#### • Ujani Reservoir-

One of the important artificial source of water for Solapur district is Ujani Dam. It is also known as Bhima Ujani Project or Bhima irrigation project. The total storage capacity of Ujani dam is 117 TMC. It is one of the biggest reservoir in the region. The catchment area of the reservoir is 2.410 km<sup>3</sup> (0.578 cumi)(Irrigation Department Solapur- 2005). The project provides water for agriculture, hydroelectric power, drinking, industries and for fishing activities. Water supplied from the reservoir to irrigate agricultural areas primarily aims to reduce incidence of famine and scarcity during drought conditions. The department generally releases water in four rotation, two rotation in winter and two in summer. Some of the important crop grown under irrigated conditions is sugarcane wheat, millet, and cotton.

Most of the reservoir water is used by Bhima Sina river and Sina-Madha Ursa jalsinchan and it is 30.41 TMC. Very less amount of water (103.89 mcm ) is used for drinking purpose and ( 7.78 mcm ) for industrial purpose.

#### • Nira Right Bank Canal

The Nira Right Bank Canal is constructed on Nira river. Total storage capacity of the dam is 25.65 TMC (726.46 mcm ). The Nira Right Bank Canal is fed by Bhatghar dam in Pune District. The length of the Canal is 153 kms passing through Solapur and Satara district. This canal system provides irrigation facilities to Malshiras taluka, Pandharpur taluka and Sangola taluka and irrigate about 35236, 5656 and 2350 hectares respectively (Nira canal, Phalton). The water available from this project is 430 mcm.

#### • Sina- Kolegaon Project

The dam constructed on Sina river, in Paranda taluka of Osmanabad district. The catchment area of the dam is 5569 sq.kms. Gross storage capacity is 150.49 mcm. Live storage is 76.19 mcm and dead storage is 74.30 mcm The length of the dam is 1770 mts

While the height is 36-60 mts. Gross cropped area under the dam is 14641 hectares and irrigated Cropped area is 12100 hectares . There is no provision of drinking water to Solapur district by this project .The dam water(1.46 mcm ) irrigate 3400 hectares land of Karmala taluka by lift irrigation. The project is

benefit Karmala, Barshi and Mohol talukas of Solapur district. The project is Completed in 2010-11.(SinaKolegaon project- Paranda). The water available for Solapur district is 1.46 mcm.

- **Kukdi Project**

Kukdi Major irrigation project constructed on Kukdi River. The work was started in 1969 and completed in 2009. Five storage dams are constructed across five tributaries such as Yedgaon dam, Manikdoh Dam, Dimbhe Dam, Wadaj Dam and Pimpalgaon Joge Dam. The total irrigable command area under the Project is 156278 hectares belongs to Seventalukas of three district namely Pune district (Ambegaon, Junnar and Shirur taluka), Ahmednagar district (Pamer Shrigonda and Karjattaluka) and Solapur district (Karmala taluka). Kukdi left bank canal irrigates 24562 hectares land of Karmala taluka. The water available for Solapur district is 1.6 mcm.

### POTENTIAL OF WATER IN SOLAPUR DISTRICT

Water is available mainly from rain and underground. Hence to fulfill the needs of population it is very essential to know the potentiality of water in Solapur district. Water potential can be studied by two ways as,

- Potential of Open surface rainwater.
- Potential of Ground water.

#### Potential of Open surface rainwater

Rain is real and important source of water. The amount of water which can be obtained from rain in Solapur district is calculated by following formula.

Formula:  $P = R \times A \times Cr.$

Where  $P$  = Potential of water in liters  
 $R$  = Annual rainfall in mms.  
 $A$  = Area of the region in Sq. mts.  
 $Cr.$  - Co-efficient of runoff.

Total area of Solapur district is 14895 Sq.kms. i.e. 1489500 sq.mts. The amount of average and annual rainfall of Solapur district is 870 mms. in 2014-15, This amount is shown in the table 4.

**Table No. 2** Annual rainfall of Solapur district.

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Rainfall	0	33	63	12	120	78	108	141	192	105	18	0	870

Source: Socio-economic abstract of Solapur district 2014-15.

Solapur district receives 870 mm. rainfall in the year 2012. Out of this 1% rainfall waists through infiltration and 4% rainfall wastage through evaporation. Hence total available rainfall is as follows ---

$$\begin{aligned} \text{Available rainfall} &= \text{Total rainfall} - \text{evaporation} - \text{groundwater} \\ &= 870 - 34.8 - 8.7 \\ &= 826.5 \text{ mm} \end{aligned}$$

Total 826.5 mm rainfall received by the earth surface in the year 2012. Hence according to the formula potential of open surface rainwater in Solapur district is

$$\begin{aligned} P &= R \times A \times \text{co-efficient.} \\ &= 826.5 \times 1489500 \times 1 \\ &= 12310717500 \text{ liters.} \end{aligned}$$

And the potential of water collected from open surface is 12,310,717,500 liters (1.23 mcm).

### Ground Water Resource

Groundwater is an important source to meet the water requirements of various sectors. Demands for groundwater resources are ever increasing from day today. It can be classified as static or dynamic based on aquifers below or above the zone of groundwater table fluctuation respectively.

The total groundwater resources would be available for utilization for irrigation, domestic and industrial uses. Out of the total groundwater resources 15% was kept for domestic and industrial uses and remaining 85% was kept for irrigation purpose. Potential and available groundwater resource in the district by monsoon and non-monsoon period given by Central Groundwater Board are given in the table- 3.

Table- 3 shows that the taluka wise groundwater resource potential of Solapur district as on 31<sup>st</sup> March 2012. Rainwater is the only means by which annual recharge of groundwater takes place. The annual rainfall of the district is very poor. Hence the general position of groundwater in the district is not satisfactory.

**Table -3** Ground water resources Potential of Solapur district as on 31st March 2012( unit ham)

Sr. No. 1	Taluka 2	Recharge from rainfall during monsoon 3	Recharge from Other Sources during monsoon 4	Recharge from rainfall during non-monsoon 5	Recharge from Other Sources during non-monsoon 6	Total Annual G.W. recharge 3+4+5+6 7	Natural Discharge during non-monsoon 8	Net annual G.W. availability 7+8
1	North Solapur	4824.59	339.79	644.87	853.69	6662.94	333.15	6996.09
2	South Solapur	8554.57	553.37	1345.57	1447.32	11900.83	595.04	12495.87
3	Barshi	7711.3	650.78	882.88	1783.37	11028.33	551.42	11579.75
4	Akkalkot	10592.36	504.82	1727.43	1366.3	14190.91	709.55	14900.46
5	Pandharpur	6887.93	1996.13	1158.9	4980.96	15023.92	751.2	15775.12
6	Malshiras	8324.3	3444.24	1902.7	8432.56	22103.8	1105.19	23208.99
7	Sangola	9809.01	1965.97	1949.1	3540.11	17264.19	943.95	18028.14
8	Mangalwedha	5236.23	984.42	764.55	2268.63	9253.83	462.19	9716.02
9	Madha	10220.16	1276.22	1474.05	3050.63	16021.06	827.02	16848.08
10	Mohol	7303.32	1144.63	1108.25	3166.11	12722.31	636.12	13358.43
11	Karmala	8503.12	884.56	1210.34	1802.6	12400.62	619.03	13019.65
	Total	87966.89	13744.93	14168.64	32692.28	148572.74	7533.86	156106.6

Source: GW Survey & Development agency. Govt. of Maharashtra (2012) (P-56, 57)

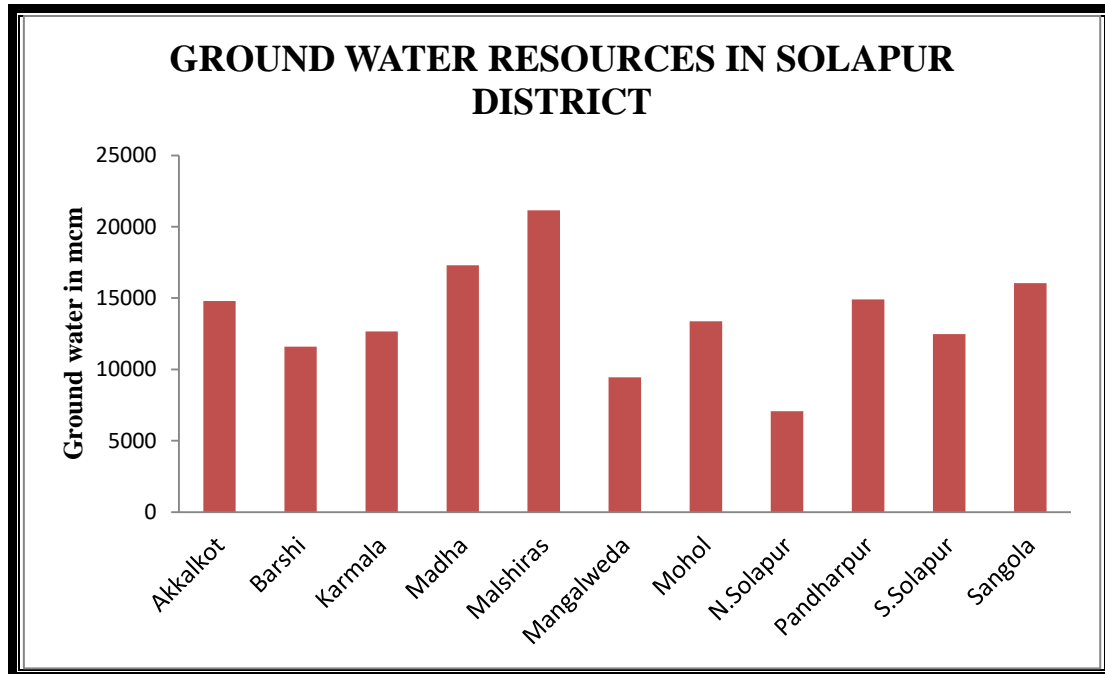
The total groundwater recharge from rainfall during monsoon season 87956.89 ham, while the recharge from other sources during monsoon season is 13744.93 ham. Recharge from rainfall during non-monsoon season is 14168.64 ham. Whereas recharge from other sources during non-monsoon is 32692.26

ham. The total groundwater recharge from rainfall during monsoon and non-monsoon season in the district is 148572.74 ham.

Net Groundwater (NGA) = Annual groundwater recharge – Natural discharge during non-monsoon

$$=148572.74 - 7533.86$$

$$=141038.88 \text{ ham}$$



**Table No-4 Total available water in Solapur District.**

Sr. no.	Details	Available water(mcm)
1	Rain water	1.23
2	Ground water	1507.84
3	Artificial water	1485.25
	Total	2994.32

Source: Socio-economic abstract of Solapur district 2014-15

Total water availability from all sources such as rain water, ground water and dam water (solapur district and from other district) are 2994.32 mcm. Rapid population growth and intensive human activities have heavy stress on groundwater and significantly fresh water is becoming scarce and dearer in many areas. It is believed that in the coming decades the people will face critical situation with regards to availability of water. So it is very important to analyze the present situation and to find the potential of rainwater and encourage the people and scholars to collect and to save the rainwater by adopting different measures and use it in the scarcity period.

### Conclusion-

Solapur District receives water through two main sources such as natural and artificial sources. Average annual rainfall in Solapur District is 550mm. It is observed that during the last 10 years the district receives high rainfall in 2010 and lowest rainfall in the year 2003. This amount of rainfall is very low. The main artificial source of water for Solapur District is Ujani dam. Total storage capacity of the dam is 117 TMC. Water is also available from Nira Right Bank Canal, Sina-Kolegaon Project and Kukdi Project.

Potential of surface water in Solapur district is 1.23mcm. The potentiality and availability of water in the district is 2994.32mcm. The proportion of water in the district is very low. Hence the district suffers from shortage of water.

**References:**

1. [www.solapur.gov.in](http://www.solapur.gov.in)
2. Government of Maharashtra, Irrigation Department, Solapurvibhag, Ujani silver jubleemagzine – 2005.
3. Government of Maharashtra, JalsampdaVibhag,Pune – Nira Right Bank Canal Department, Phalton.
4. Government of Maharashtra, Irrigation Department – Sina- Kolegaon Project, Paranda.
5. Socio – Economic abstract of Solapur District.
6. Government of Maharashtra, Central Groundwater Survey and Development Agency.