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Water Situation and Its Planning In Solapur District: A Geographical Study

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Abstract

Water is important resource to our economy as an essential requirement for drinking, industry, and agriculture and power generation. Many parts of India are facing the water scarcity problem. In their areas the water conservation and management is essential activity. Water conservation means the action taken to reduce water use by improving the efficiency of various uses of water. Solapur district is located in drought prone area of Maharashtra, hence this district is facing drought problem every year. Therefore need of water conservation and management is essential in Solapur district.

Keywords: water management, drought, conservation.

Introduction

Water is one of the most valuable natural resources and plays a vital role in sustaining life, agriculture, industry, and economic development. In India, increasing population, rapid urbanization, and changing climatic conditions have intensified the pressure on available water resources. Drought-prone regions are particularly vulnerable to water scarcity, making water conservation and management essential for sustainable development.

Solapur district of Maharashtra is located in the rain-shadow region and frequently experiences low and erratic rainfall. Agriculture, the primary occupation of the district, largely depends on the availability of water for irrigation. Recurring droughts, depletion of groundwater resources, and inadequate water storage facilities have created serious challenges for both agricultural productivity and domestic water supply. Therefore, effective planning, conservation, and management of water resources have become crucial for the socio-economic development of the district.

The present study examines the status of water resources, irrigation facilities, and water conservation practices in Solapur district. It also identifies the major problems associated with water management and suggests suitable measures for the sustainable utilization and conservation of water resources in the region.

Objectives

1. To study the water resources conservation and planning in Solapur district.
2. To give suggestion and recommendation for water conservation and management.

Methodology

Data Base and Methodology to study the present status of Water Conservation and Management we collect the secondary data from Government Irrigation Department and Agricultural Department of Solapur district. Different cartographic techniques are used for analyzing and representation of statistical data

Study area

Solapur district is located between 17°10 to 18°32 north latitude and 74°42 to 76°15 east longitudes. It is bounded by Ahamdangar and Osmanabad districts on north. Osmanabad district and Andhra Pradesh state in the east, Karnataka state and Sangli district in the south, Pune and Satara district in the west, it lies in basins of Nira, Bhima, Sina and Man river. For administrative purpose the district is divided into eleven Tehsils. Solapur is one of the drought prone district of Maharashtra

1. Need For Irrigation Purpose:

Irrigation is the artificial application of water to overcome the deficiencies in rainfall for the growing of crops. It is essential for the better yield and for assurance of the crops. Irrigation development in Solapur district has to be viewed, in the context of the climatic conditions, especially rainfall with a wide difference in rainfall from one part to other part of the district and from year to year. The area which is affected by the variation in rainfall is mainly located in the district.

Agriculture is highly speculative venture under such harsh condition which affects the agricultural production and efficiency. Therefore, irrigation is vital for the success of agriculture as well as in domestic use. Moreover, rainfall of the district is seasonal and it is handicapped by lack of water from November onwards, hence the Rabi crops usually fail. In order to sustain Rabi crops in Solapur district, the artificial supply of water becomes most essential and necessary.

Table 1
Sources of Irrigation and Its Changes in Solapur District (1980-81 to 2010-11)

(In Percent)

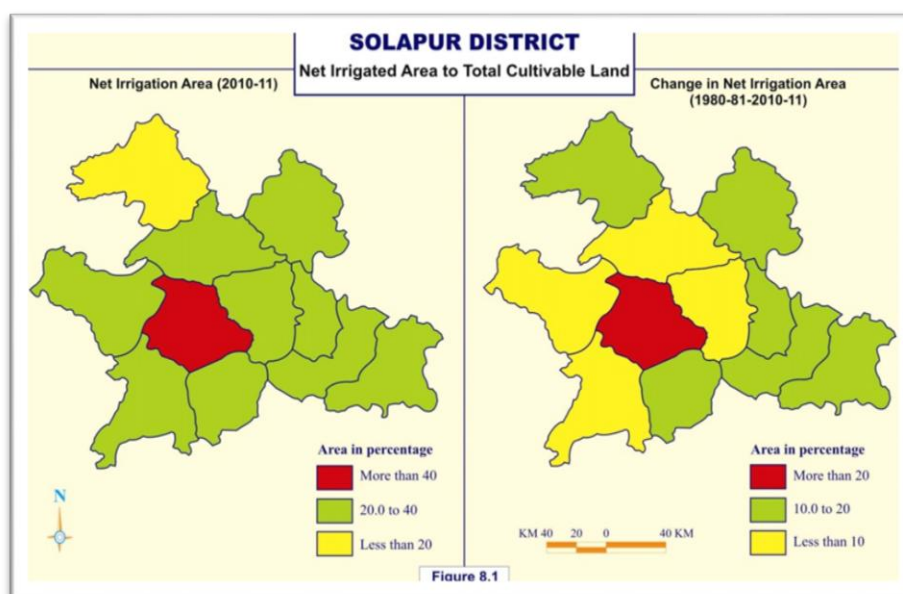
Source of Irrigation	Year				Volume of Change		
	1980-81	1990-91	2000-01	2010-11	1981-91	1999-01	2001-11
Surface	23.5	40.8	24.1	24.7	17.3	-16.7	+0.6
Underground	76.5	59.2	75.9	75.3	-17.3	16.7	-0.6
Land to total cultivable net irrigated	13.1	10.8	25.7	23.9	-2.3	14.9	-1.8

Source: Socio-economic abstract of Solapur district 1981-2011.

Net Irrigated Area to Total Geographical Area:

The total net irrigated area in the region was about 13.1 percent in 1980-81 to total cultivable area and there after remarkable decline was noticed in the year 1990-91, which became 10.8 percent. This decline in proportion of irrigated land to total cultivable land may be due to the scarcity of rainfall. During the last few decades the source of irrigation was only the rainfall, which fills the tanks, lakes and dams as well as underground water. Surprisingly, the net irrigated area during the recent decades of 2001 was very high. The proportion of irrigation land due to the improvement in irrigated land was very impressive 25.7 percent. Implementation of modern technologies and facilities provided to farmers by the government in the district of Solapur is quite satisfactory. In the last decade the net irrigated area was slightly decline in the year. 2010-11. This condition seen due to drought condition in the year 2010

Fig. 8.1 shows the proportion of net irrigated area as the average for 2010-11 year. it reveals that overall intensity of net irrigated areas varies remarkably in different parts of the district. the highest intensity of net irrigated area were found in western Solapur tahsil consisting of Pandharpur and Sangola tahsils. The proportion ranges between 20 percent to 40 percent in Malshiras, Madha, Mangalwedha, Barshi, Akkalkot, North Solapur and South Solapur tahsils. In these tahsils the moderate condition of net irrigated area are noticed due to build of new small irrigation project and development of advanced modern irrigation sources. The intensity of low net irrigated area are observed only in Karmala tahsil because in the last past decades the source of irrigation was only rainfall. This tahsil have drought area in the region understudy.



Both positive and negative changes area in the region understudy, in the study region, during 1980-81 to 2010-11. Malshiras ,Madha, and Mohol tahsils recorded less than 10 percent changed while Pandharpur and Sangola tahsil recorded more than 20 percent increase in net irrigated area in the district.

Surface Irrigation:

Surface irrigation includes rivers, tanks, lakes, canal and small dams. The total surface irrigation area in the region was about 23.5 percent in 1980-81. Thereafter, it increased to 40.8 percent in the year 1990-91. This is

clearly indicated by the proportion of surface irrigation which increased due to government of Maharashtra and Zilla Parishad, Solapur have constructed number of percolation tanks and canals in this region under the employment Guarantee scheme. During the decade of 2000-01 surface irrigation like tube wells, the area under surface irrigation was 24.1 percent. During the last decade slightly increase of surface irrigation are noticed and it became 24.7 percent.

Fig 8.1 shows the proportion of the surface irrigation for 2010-11 year. The highest intensity of surface irrigated area was found in south eastern Solapur tahsils consisting of Madha and South Solapur. The proportion range between 15 percent to 30 percent in Karmala, Barshi, Malshiras and Akkalkot tahsils. The intensity is low in rainshed areas of west central and eastern part of the district.

There are many tanks such as Ekruk in North Solapur, Buddehal in Sangola. Gheradi in Sangola Tawale in Sangola, which are the main source of surface irrigation in the region under study. Besides, there are many other tanks in other parts of the district such as Pathri, Barshi, Hotagi in south Solapur, Wadshivane, Karmala and Saptane in Madha which provide irrigation in the concerned region. Canal irrigation plays important role in the overall irrigation of the district. the area under canal irrigation increased by the major Ujani irrigation Project on river Bhima, near Ujani village in Madha tahsil of Solapur district.

Both, positive and negative changes in surface irrigation were found in the study region, during 1980-81 to 2010-11. Karmala , Malshiras , Pandharpur, Mangalwedha and North Solapur tashils recorded less than 10 percent increased, while South Solapur , Sangola , Madha, Mohol, and Akkalkot tahsils recorded more than 20 percent increase in surface irrigation in the district. (table 8.3)

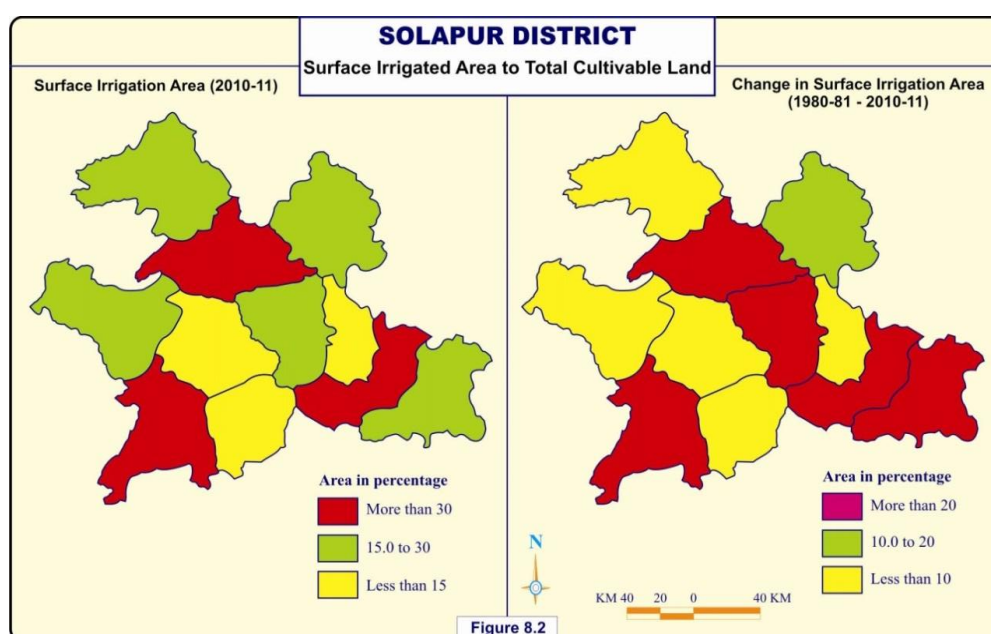


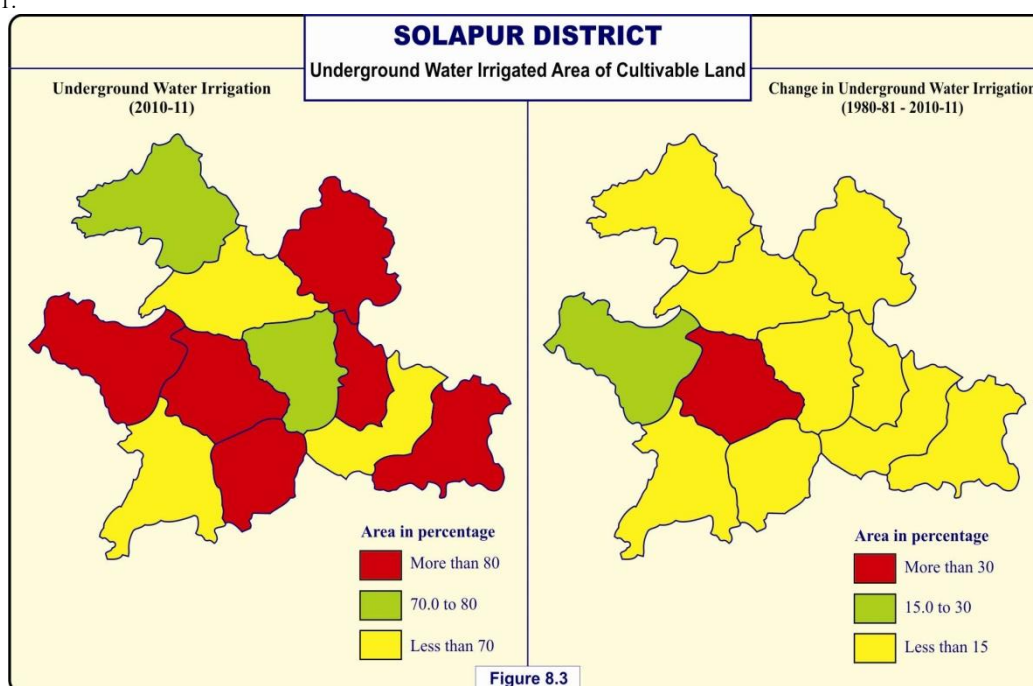
Table 2
Different Sources of Irrigation in Solapur District. (1980-2011)

	Tahsils	Surface			Underground			Net irrigated		
		1980-81	2010-2011	Vol. of Change	1980-81	2010-11	Vol. of Change	1980-81	2010-11	Vol. of Change
1	Madha	22.8	55.8	33	77.2	44.2	33	25.6	22.2	-3.4
2	Barshi	4.1	19.3	15.2	95.9	80.7	-15.2	9	25.2	16.2
3	N.Solapur	9.2	2.3	-6.9	90.8	97.7	6.9	9.8	23.9	14.1
4	Mohal	1	29.7	28.7	99	70.30	-28.7	3.7	15.2	11.5
5	Pandharpur	53.9	13.9	-40	46.1	86.1	40	15.7	53.1	37.4
6	Malshiras	45.8	16.1	-29.7	54.2	83.9	29.7	39	29.1	-9.9
7	Snagola	8.8	65.1	56.3	91.2	34.9	-56.3	14.4	20.1	5.7
8	Karmala	20.7	26.4	5.7	79.3	73.6	-5.7	4.6	19.1	14.5
9	Mangalwedha	11.4	10.7	-0.7	88.6	89.3	0.7	21	28.6	7.6
10	S.Solapur	1.8	56.4	54.6	98.2	43.6	-54.6	4.6	20.2	15.6
11	Akkalkot	-	18.8	-	100	81.2	-18.8	9.8	23.9	14.1
	District Total	23.5	24.7	1.2	76.5	75.3	-1.2	13.1	24.8	11.7

Source: Socio-economic Abstract Solapur 1981-2011

Underground Water Irrigation:

Tube wells are the major source of underground water irrigation in the Solapur district. the total under ground water irrigation in the region was about 76.5 percent in 1980-81. Thereafter it considerably decreased to 59.2 percent in 1990-91. During the recent decade, it has increased by 75.9 percent due to improvement of tube wells in the region understudy. In the last decade the underground water has declined and it became 75.3 percent in 2010-11.



Irrigation In Solapur District:

Wells are the principal source of underground irrigation. Table 8.5 shows, the distribution of wells in each tahsils classified as useful for irrigation and other which after not useful for irrigation. There are about 68550 tube well in the district out of these 6872 are not useful for irrigation. The density of wells is high in the low leveled to moderate undulating terrain of the district than that of the hilly terrain. The largest number of irrigation tube wells is found in Pandharpur tahsil which are 12220, while number of tube wells not useful for irrigation is more in South Solapur tahsil.

Table 3
Irrigation in Solapur District 2013-14

S.N	Tahsils	wells	Not usef for irrigatio n	Useful for irrigaton	S.N	Tahsils	wells	Not usef for irrigatio n	Useful for irrigatio n
1	Karmala	3901	860	3041	7	Malshiras	3302	104	3198
2	Madha	6566	267	6299	8	Snagola	8510	545	7945
3	Barshi	7002	776	6226	9	Mangalwedha	6458	421	6037
4	N.Solapur	1726	297	1429	10	S.Solapur	5875	1826	4049
5	Mohol	3820	239	3581	11	Akkalkot	9170	258	8912
6	Pandharpur	12220	1279	10941	12	Total district	68550	872	61678

Source: *Socio-economic Abstract Solapur 2011-2012*

Fig.8.3 shows, the proportion of underground water irrigation in the Solapur district in 2011-12. It clearly reveals that overall intensity of irrigation varies remark in different parts of the district, the highest intensity of underground water was found in Malshiras, Mangalwedha, Pandharpur, Akkalkot, Barshi and South Solapur tahsils. The less intensity was observed in Sangola, Madha and South Solapur tahsils.

Both positive and negative changes in underground water irrigation were found in the region during 1980-81 to 2011-12. Malshiras tahsil recorded more than 30 percent positive change while Pandharpur tahsil recorded 15 to 30 percent increased. Other rest thasils having less than 15 percent increase in the district.

Solapur district is found in rain shadow area so that, there is a more need of irrigation facility, the major and medium irrigation project like the Nira right bank canal is not utilized sufficiently. Wells become dry in summer period which is turn also increase the problem of drinking water in the study region.

Problems of Water Conservation In Solapur District.

In Solapur district, there are number of problems faced by the region under study in water sector. As the region belongs to draught prone region of Maharashtra state, hence, the water resources have manifold problems to be tackled in order to make the region self supporting in the agricultural produced. Following are the some of the problems faced by the agriculture sector in Solapur district.

1. Uncertainty of Rainfall:

Out of the total regions annual rainfall, nearly 85 percent rainfall is received during monsoon period, sometimes region gets more rainfall some time it provides less rainfall to the region. Rainfall is the dominant single water element influencing the intensity and location of farming system and the farmers choice of the enterprises.

2. Problem of Drought Condition:

Solapur district comes under drought prone area. But some times region get heavy rainfall and wet famine occurs in the region. And also important fact that sometimes dry famine found in the region due to absence of monsoon rainfall. In summer season wells, lakes, become dry, resulting in the shortage of drinking water in Solapur district.

3. Problems of Storing Water :

Generally, in Solapur district population tendency is not found to keep the store water properly. Because, the lack of information about rainwater harvesting system and also important things that the Government is not interested in this type project of Solapur district.

4. Problems of Construction of Tube wells:

Tube wells are also important for water sources. Solapur region has also considerable number of tube wells. Unfortunately, most of these tube well are either mismanaged or out of order.

5. Problems of the Wells Construction:

The region has a large number of wells and these wells irrigate considerable percentage of land. The main problem conserving wells are that sometimes people get money from the respective Bank of Government for the construction of well and do not invest some times wells are dug only few feet below., hence, these wells fail to supply enough water during summer season.

6. Inadequate Irrigation.:

In Solapur district there are few Constructed major, medium, and small projects. All these projects fail without water because, in summer season due to shortage of proper rainfall distribution resulting in the adverse situation in the irrigation.

7. Over Use of Water:

The real problem of Solapur district is that, there are two third population depend on Agriculture sector. Hence, agriculture sector use more water for the production of foods. Hence, the ever growing population is creating a tremendous pressure on water resource.

There are numbered of problems in Solapur district, to overall development due to scarcity of water. In view of this, it most essential and appropriate to conserve water.

Conclusion

This research paper associated with the need for water conservation and management in Solapur district. The low and erratic rainfall normally occurs. As a result, the loss is about 50 to 60 percent of rainwater from the surface., this surface runoff, if, harvested over a large area can yield considerable amount of water for storage and providing life saving irrigation to the crop during the dry season and also for growing a second crop in rabbi season. Additionally, long breaks in the monsoon and low intensity of rain, limit the run off flow into the ponds during dry spells when water needed most. Therefore, all eleventh tashils must try to store maximum water in rainy season for future use. But in Solapur district, water condition as compared to other district is very poor. It can be confidently stated that in most part of Solapur district there is a great loss of water resources.

The highest intensity of net irrigated area was found in western Solapur consisting of Pandharpur and Sangola tahsils. The proportion of irrigated land ranges between 20 to 40 percent in Malshiras, Madha, Mangalwedha, Barshi, Akkalkot, North Solapur and South Solapur tahsils. In these tahsils, the moderate conditions of net irrigated area are noticed due to construction of new small irrigation project and development of advanced modern irrigation sources. The intensity of low net irrigated areas is observed only in Karmala tahsil because in the last decade the source of irrigation was only rainfall. These tahsils have drought area in the region under study.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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