

"A Study of Irrigation Setup in Sangli District"

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ABSTRACT: India is now unable to meet feeding needs of growing population as the sufficient water supply is not available for agricultural produce. Considering the growing population of the country which is recently recorded more than 136.26 crores (Department of Economic and Social Affairs, Population Division) it is needed that to reduce the waste use of water and to identify and adopt advanced water supply resources as well as tools. Present research deals with such irrigation practices in Sangli district of Maharashtra state. At present, 5 percent land is irrigated by sprinkler system, 75 percent cultivated lands are irrigated by surface and national irrigation system, 20% farming land is irrigated by drip irrigation. Irrigation and human civilization is interrelated to each other. It is taken as a devise of speedy economic development and tool of agricultural produce growth. It is also useful to overcome from danger effects of scanty and irregular rainfall. Therefore, stability and growth of agriculture in particular and development of economy in general is depends upon efficiency and effective panned use of water resources. Artificial supply of water is become more essential in the conditions of decreasing natural water resources. Natural irrigation, drip irrigation, surface irrigation and sprinkler irrigation are the major irrigation practices in study region. But all are not backed by natural water resources and suffering from recurring droughts. Present study deals with tackling loopholes in such major irrigation practices in the region and to suggest better policies for better results.

Key Words: Surface Irrigation, Sprinkler Irrigation, Soil Fertility, Surface, Soil etc.

INTRODUCTION:

In the rural India agriculture is major occupation and source of livelihood for many people. About 2/3 of Indian population is still depends upon agriculture and the need for food to feed the needs of growing population is increases day by day. An agriculture sector also contributes near about 17.32 percent share in Gross Domestic Products (GDP) and Gross Value Added (GVA) is around 23.82 lakh crore Indian rupees. Irrigation management and their uses plays crucial role in agricultural produce. At on side water resources are steadily decreasing and pressure to provide the sufficient water for urbanization and industrialization is increasing rapidly. Hence, it is necessary to reduce water consumption in farming field and to make the same is available for various sectors as mentioned earlier. Agriculture is the backbone of both rural as well as urban India as more than 70% industries are depends upon agriculture and majority Indian agriculture is depends upon natural irrigation. For the protective and productive agricultural growth secured source of water supply and effective irrigation management is obligatory. Current ultimate irrigation potential of the nation has been increased from 22.6 million ha (1950-51) to 139.5 million ha (2017-18). At the same time foodgrains production is also increased from 50.8 million tons (1950-51) to 277.49 million tons (2017-18). Irrigated agriculture system is contributing about 60 percent share in total Indian agriculture production. Maharashtra state and the study region merely records 15% and 17% irrigated area of the total area cultivated which is lower than nations figure of 18%. This potential has to be increase by adopting various management practices. Present research helps for such practices for the growth of farmers in particular and agriculture in general.

OBJECTIVES OF THE STUDY:

- To examine the irrigation setup in Sangli district.
- To analyze irrigation intensity in the study region.
- To suggest the better policy framework based on findings if necessary.

RESEARCH METHODOLOGY:

The researcher has used secondary data available through articles, annual reports of agriculture department, statistical reports of Government of Maharashtra, journals, books, websites, internet etc. for the present research. Collected data from such various sources about irrigation development in the region, irrigation intensity, factors influencing use of irrigation, various irrigation sources and their applications in

the district, factor's affecting irrigation, irrigation benefits as well as their impacts on production, productivity and income has been tabulated, analyzed, correlated and evaluated by using tools like average, percentage and correlation etc. by applying software's such as MS-Excel and Statistical Package for Social Sciences (SPSS). District Statistical Abstract (DSA) was the major source of data collection in the present research.

STUDY REGION:

The Sangli district is situated in southern part of Maharashtra state and is a part of Deccan plateau. It is situated between the latitudes 16°45' N and 17°33' N and longitudinal of 73°41' east and 75°41' east. The district is bounded by Satara district on the North western side. Southern is boarded by Belgaum and Bijapur district of Karnataka State at the centers and east Kolhapur district and the Ratnagiri district lay on west of Sangli district. The total area of the district according to 1991 census is about 8601.5 sq. km. According to 2001 census, the population was 25, 81,835 lakhs and the literacy rate is about 76.6%. The district is divided in to five administrative sub-divisions like Khanapur, Walwa, Miraj, Tasgaon and Palus. The Shirala and Walwa tehsils were included in Walwa sub-division. The Miraj sub-division comprises Jat, Kavathemahankal and Miraj tehsils. The Khanapur sub-division includes Atpadi and Khanapur and Palus sub-division includes Kadegaon and Palus tehsils.

IRRIGATION IN THE DISTRICT:

Artificial applications of water for removing negative impacts of scanty or heavy rainfall is always useful for the betterment of farm yield and more income as well as more employment. Irregular distribution of water supply and uneven rainfall has increased the importance of such artificial applications in the study region. Famines rainfall and recurring droughts in the region usually found in all over the region. These harsh conditions affects negatively on farm produce. Looking towards irrigation in the district it is found that irrigation facilities are well developed in some parts but lot of scope for development in rest of the parts. Wells, tube-wells, canals, lift irrigation, farm tanks are the major sources of irrigation in the district. It is seen that, net irrigated area of the district has increased from 1, 42,058 hectares in the year 2008-09 to 1, 44,137 hectare and gross irrigated area was recorded 1, 59,440 hectares during the year 2015-16. In the year 2015-16, highest net and gross irrigated area was recorded in Walwa tehsil 26,592 hectares and 29,804 hectares respectively. The same was followed by, Miraj (25,146 and 26,621 hectares), Tasgaon (22,594 and 23,239 hectares), Shirala (15,069 and 16,459 hectares), Khanapur (17,956 and 20,800 hectares), Jat (17,933 and 20,920 hectares), Atpadi (10,024 and 11,349 hectares), Kavathemahankal (8,823 and 10,248 hectares). Figures for the Palus and Kadegaon tehsils are not available for the same year. As compared to the net and gross irrigated area to total cultivated land in the district it is found that Jat tehsil is at the bottom due to continuous scanty rainfall. Thus tehsil is still deprived from modern irrigation tools. It is also found that, tehsils like Shirala, Walwa, Miraj and Tasgaon having good amount of irrigation potential as compared to others. Shirala and Walwa tehsils blessed by good eye of monsoon over the past many years. As a result net irrigated area percentage in the district is high.

TABLE 1
IRRIGATION STRUCTURE OF THE DISTRICT

Particulars	Area (hectares)	
Net Irrigated Area	1,44,137	
Gross Irrigated Area	1,59,440	
Name of the Tehsil	Area under Cultivation (hectares)	Total Net Irrigated Area (hectares)
Shirala	54,347	15,069
Walwa	75,604	26,592
Palus	*NA	NA
Kadegaon	NA	NA
Khanapur	1,15,984	17,956
Atpadi	80,899	10,024
Tasgaon	1,02,573	22,594
Miraj	91,833	25,146
Kavathemahankal	69,080	8,823
Jat	2,12,593	17,933

Groundwater availability and use* (Data Source: State/ Central Ground Water Department/Board)	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc.)
Over exploited	60	Good
Critical	20	Good
Semi-Critical	-	0
Safe	20	Salty
Waste water availability and use	-	-
Ground water quality	-	-

(Source: Statistical Abstract of Maharashtra 2014-15.*NA= Not Available.)

WELL IRRIGATION:-

The major source of irrigation in the region is wells. Following table shows tehsil wise density of wells in the district.

TABLE 2
TEHSIL WISE DENSITY OF IRRIGATION WELLS IN 2014-15

Tehsil	1	2	3	4	5	6	7	8	9	10	Total
Total Wells	2641	4752	*NA	NA	9226	2675	7910	9294	7100	10466	54064
Useful for Irrigation	2390	4022	NA	NA	8646	2405	6664	9135	6040	9746	49437
% to Total Wells	90.5	84.6	NA	NA	93.7	89.9	84.2	98.3	85.1	93.1	91.4
Not Useful for Irrigation	251	730	NA	NA	580	270	1246	159	530	720	4627
% to Total Wells	9.5	15.4	NA	NA	6.3	10.1	15.8	1.7	7.5	6.9	8.6

(Source: Statistical Abstract of Maharashtra 2014-15.*NA= Not Available.)

(1=Shirala, 2=Walwa, 3=Palus, 4=Kadegaon, 5=Khanapur, 6=Atpadi, 7=Tasgaon, 8=Miraj, 9=Kavathemahankal, 10=Jat)

Table 2 shows the total number of wells as well as number and percentage of useful and not useful wells in each tehsil. From the table it is observed that, percentage of wells useful for irrigation is highest in the tehsil named Miraj (98.3%), followed by Khanapur (93.7%), Jat (93.1%), Shirala (90.5), Atpadi (89.9%), Kavathemahankal (85.1), Walwa (84.6) and Tasgaon with 84.2 %. It is remarkable that even Atpadi tehsil is located at drought prone zone still 89.9 % wells out of total are in good condition and working for agricultural use.

On the other hand, considering the percentage of not useful wells to the total strength of available wells in the district it is seen that, Tasgaon recorded highest percentage in negative way which is quite unacceptable for the region fall in sufficient rainy zone.

TANK IRRIGATION:

It is observed that, some tanks are constructed near to the northern part of region viz. Kuchi, Anjani, Khanderajuri, Landagewadi, Koasari etc. but as per the government records this area is still non-irrigated. Sangli Municipal Corporation and Government of Maharashtra have constructed many percolation tanks in the region and they are still working but only few of them helps to improve ground water level useful for agricultural use.

CANAL IRRIGATION:

Both the private and public (government) canals are playing pivotal role in the irrigation of Sangli district. Private canals are the cheap source of irrigation as they drawn from water behind the small bunds built across the streams and valleys. Compared to this public canal irrigation plays a vital role in the overall irrigation of the region.

Table 3
MAJOR IRRIGATION PROJECTS IN SANGLI DISTRICT (2012-13)

Main Project	Warana	Krishna-Koyana	Siddhewadi	Doddanala	Ner
Year of Completion	2009	2008	1988	1984	1986
Length of Canal (KM)	220.50	381.00	29.00`	8.40	38.80
Storage Capacity (Cusecs)	974.19	*NA	8.58	7.78	9.13
Total Beneficial Area (Hectare)	111823	154505	1332	1346	4548

*(Source: Statistical Abstract of Maharashtra 2014-15.*NA= Not Available.)*

Form the table it is observed that, Krishna-Koyana irrigation project is the largest beneficial project in region as beneficial area under the project is 1, 54,505 hectares followed by Warana project with 1,11,823 hectares beneficial area. Ner irrigation project was at number three with 4,548 hectares beneficial area. Besides this Doddanala and Siddhewadi irrigation projects stood fourth and fifth position respectively.

TEHSIL WISE WEIR BASINS IN THE DISTRICT:

There were various weir basins are constructed by the both public and private stakeholders. Both plays crucial role in the irrigation of the district. It is seen that, in the percentage of total beneficial area in the study region major portion is benefited through such irrigation projects. It is also reveals that, most of the weir irrigation projects were either small in size or they were large. Medium irrigated projects and both the beneficial and irrigated area from the same was low as compared to large and small weir irrigation projects in the present research region. However, majority of the small irrigation projects were still working properly for the betterment of agriculture field in the district. At the same time both medium and large irrigation projects also plays crucial role in the development and survival of farming in both the cultivation seasons. Following table shows the importance and tehsil wise distribution of major weir projects.

Table 4
MAJOR WEIR BASIS IN THE STUDY REGION

Name of Tehsil	Small Weir Projects		Medium Weir Projects		Large Weir Projects	
	Beneficial Area (Ha.)	Irrigated Area (Ha.)	Beneficial Area (Ha.)	Irrigated Area (Ha.)	Beneficial Area (Ha.)	Irrigated Area (Ha.)
Shirala	1.81	0.87	13.47	23.22	0.00	0.00
Walwa	31.28	40.55	12.81	17.62	0.07	0.10
Palus	12.96	14.05	19.30	24.82	0.41	0.57
Kadegaon	3.78	1.31	0.00	0.00	11.39	11.59
Khanapur	6.15	1.77	0.00	0.00	14.32	6.47
Atpadi	6.58	3.16	0.00	0.00	8.20	0.00
Tasgaon	3.07	0.95	24.64	26.24	12.88	12.59
Miraj	16.93	31.87	0.00	0.00	23.32	32.88
Kavathe-mahankal	3.05	2.28	4.53	7.03	13.65	13.27
Jat	14.40	3.19	25.26	1.07	15.77	22.23
Total	100662.00	95976.00	19046.00	6555.00	271192.00	101427.00

(Source: Statistical Abstract of Maharashtra 2014-15.)

Table 4 reveals that, in small weir irrigation projects Walwa tehsil was on top in beneficial area compared to total beneficial area in the district with 31.28% share followed by Miraj tehsil with 16.93%, Jat tehsil with 14.40%, Palus tehsil with 12.96% share, Atpadi tehsil with 6.58%, Khanapur tehsil with 6.15%, Kadegaon tehsil with 378%, Kavathemahankal tehsil with 3.05% and Shirala tehsil with 1.81 percent share

respectively. Considering the total irrigated areas tehsil wise percentage it is seen that, the same trend is observed.

Large weir irrigation projects and both the benefited and irrigated area under were more in Miraj, Kadegaon and Kavathemahankal tehsils. Whereas in medium weir irrigation projects Tasgaon, Palus and Shirala tehsils were on top.

MAJOR FINDINGS:

Following are the major findings of present research work:

1. Irrigation facilities in the tehsils named Shirala, Walwa, Palus and Tasgaon are well developed as compared to the rest of tehsils. Tehsils named Jat, Atpadi and Kavathemahankal are eventually falls under drought prone zone. Less irrigation intensity is an outcome of this heretic environmental condition.
2. Total 1/6th groundwater usages are over exploited, 20% is critical and only 20% is safe which is not a good sign for agricultural usages.
3. Eighty percent water quality is good but twenty percent is salty.
4. On an average more than 80% wells are in good condition and still working for agricultural use. But Tasgaon tehsil is an exception for this, as this tehsil has recorded around 16% wells not useful for irrigation.
5. Considering both public and private tank irrigation projects it is found that, only few of them are useful to improve the groundwater level.
6. Private canals are the cheapest of irrigation in the district but public canal irrigation is a foremost source of irrigation with the help of Warana, Krishna-Koyana, Siddhewadi, Doddanala and Ner irrigation projects. Majority of the gross and net irrigated area comes under Krishna-Koyana irrigation project.
7. Weir irrigation projects those large in size and both the benefited as well as irrigated area under weir irrigation is more in Miraj, Kadegaon and Kavathemahankal tehsils. Whereas in medium weir irrigation projects Tasgaon, Palus and Shirala tehsils were on top.

SUGGESTIONS:

1. In order to improve irrigation density in the district both public and private sector have to perform more consistently and enthusiastically. They should construct more small irrigation projects in less irrigated and drought prone zone in intention to improve groundwater level i.e. farm tank irrigation.
2. There is a need of more medium size weir irrigation projects.
3. Government has to rearrange and reframe water supply schedule for better water management.
4. More support from local peoples is required in the construction of large irrigation projects as migration of some families is obligatory.

CONCLUSION:

There are two important irrigational problems in the Sangli district. Firstly, the major and medium irrigation projects are not utilized sufficiently. Secondly, considerable area is affected by water logging and salt efflorescence. Rise of subsoil water in the irrigated area is the first symptom of the damage being done to soils. The harmful effects of this rise of subsoil water are noticeable when the water level comes to within one meter from the ground level. In Sangli district 75% agriculture land is irrigated by surface and natural irrigation system, 20% agriculture land is irrigated by drip and 5% land is irrigated by sprinkler irrigation system. The most efficient method used is drip irrigation system. In all above practices of irrigation systems the soil moisture is not taken into consideration. By considering the soil moisture with drip irrigation will be best irrigation system in future. Irrigation happens to be the key input for the development of agriculture. The study deals with spatiotemporal distribution of means of irrigation, its impact on the cropping pattern and the yields of crop. Sangli district is one of the agriculturally developing parts of state having intra-regional disparities.

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