

**Anekant Journal of Humanities
and Social Sciences**

A Half Yearly and Peer Reviewed Open Access Print and Online Journal
<http://www.humanitics.org/>

RESEARCH ARTICLE**Vol. IV, Issue I, August 2021****Title- IRRIGATION SYSTEM IN BARAMATI TAHSIL**

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Abstract:

Baramati Tahsil depends mainly on monsoon and its quantity. So, proper efforts should be taken to ensure continuous water supply. Water is the main need for agriculture in Baramati Tahsil. Out of the total agricultural land, 40 percent area is irrigated, and 60 percent area depends upon rainfall. The southern part of Baramati Tahsil does not require rainwater for the various crops, because it gets water from rivers and canals. The northern part depends wholly upon monsoon which uncertain rain. The Baramati Tahsil requires irrigation because of insufficient rainfall. Irrigation is an “artificial water supply in proper ratio and at proper time for agricultural purposes”. The Baramati Tahsil needs water in different volumes for different crops and as rain is scarce the necessity of irrigation arises, to increase crop yield. The present paper studies the topographical factors responsible for irrigation system and the effect of irrigation on yield of crop and distribution in Baramati tahsil. Latest irrigation system techniques have proved to be very effective in the development of drought-prone area. These techniques have demonstrated positive increase in the standard of living of farmers due to change in the cropping pattern, conservation methods and allied activities.

Keywords: Irrigation, Block system, Minor irrigation project, Lift irrigation, Percolation tank, K.T Weir.

Study Area:

The area of this study is Baramati Tahsil which lies between 18°3' to 18°12', north latitudes and 74° 13' to 74° 30' east longitudes. It is located at an altitude of 538 meters above mean sea-level. The Tahsil lies in the eastern part of Pune district of Maharashtra. The river Nira flows west to east forming the southern boundary of the Tahsil and the district. The river Karha flows northwest to south – east. Baramati Tahsil is bounded by Indapur Tahsil towards the east, Satara district towards the south, Purandar Tahsil towards the west and Daund Tahsil towards the north. Baramati city covers an area of 4.35 sq km (Census.2001) (excluding 824.8 hectares of land of Baramati M. I. D. C. and Industrial estate). The area of Baramati Tahsil is 1382 sq km. The distance between Mumbai and Baramati is 260 km by road and between Pune and Baramati it is 100 km by road and railway. Baramati Tahsil is somewhat rectangular in shape.

Data base and Methodology

The present study has been carried out with the help of data collection, compilation, tabulation, computation, analysis, and interpretation of the basic data regarding water resource. Various relevant aspects have been collected from secondary sources of information i.e., tehsil office, Agricultural trust Baramati, census handbook of Pune district, socio-economic reviews, district statistical abstract and various published reports. Thus, the present work has been accomplished with the help of descriptive interviews and data collected from officials, supervisors and farmers which are secondary data.

History of Irrigation in Baramati Tahsil

Main water resources of the Baramati Tahsil are Nira and Karha river, Nira Canal etc. Though monsoon water is not available it is sufficient to fill these rivers. Baramati Tahsil is also known as a highly drought-prone area because agriculture in this area depends upon rainfall, which is low. Baramati Tahsil was badly affected by famine of 1876 - 1878 during British rule. Famine riots occurred during this period. To stop these riot British Government started famine works, through construction of Nira left canal. After construction of this canal in 1882, old Bhatghar Dam was constructed during 1883 – 1892. Afterwards new Bhatghar Dam was constructed during 1923 – 1927. Old pick-up weir was constructed on Nira river near Veer. A few years later, during 1956 – 65 Maharashtra Government constructed a new dam in Veer. During this period excavation of Canal of Khadakhwasala Dam in Mula river was started.

Khadakhwasala Canal runs from northern side and Nira left canal runs from southern side of Baramati Tahsil. The area under irrigation-development is small. There was increase in agricultural area, but only 22 villages out of 65 (1971 Census) in Baramati Tahsil i.e., 1/3 area benefited from this Canal. The remaining 43 villages continued to depend on uncertain rainfall. Forty-three villages, that is 13534.75 hectares are irrigated by the Nira left canal. Previously these villages were totally dependent upon rainfall, due to which a large amount of canal water was wasted. Then, the question arose in the mind of the British Government, about the people's disinterest to use canal water, and their preference for rainwater. So, British Government introduced 'Block' system, for the first time in India on Nira left and right Canals. The British Government forced the farmers to carry on agriculture based on Block system to increase agricultural yield. The British Government introduced six different types of Block systems. These are as follows:

1) Sugarcane Block

Table– 1.1: 0.60-hectare area carried out for 6 years

Old Sugarcane	New Sugarcane	Other Crops	Total Area
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0.15	0.15	0.15	0.15	0.60 Hectares
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(Source – Minor Irrigation Department of Baramati Tehsil)

2) Fruit Block:

Table-1.2: According to the British Government this Block should be carried on for 12 years.

Fruit	Total Area
0.60	0.60 Hectares

(Source – Minor Irrigation Department of Baramati Tehsil)

3) Garden Block (Other Fruits such as Banana, Papaya etc):

Table-1.3: It should be grown for 12 months

Garden	Total Area
0.60	0.60 Hectares

(Source – Minor Irrigation Department of Baramati Tehsil)

4) Two seasonal Blocks:

Table-1.4: Two season

Kharif	Rabbi	Total Area
0.30	0.30	0.60 Hectares

(Source – Minor Irrigation Department of Baramati Tehsil)

Kharif crop: Bajra.

Rabbi crops: Jowar, wheat.

Kharif crops 0.30 Hectares.

Rabbi crops 0.30 Hectares.

5) Three seasonal Blocks:

Table-1.5: Three season

First Season 4 months	Second Season 4 months	Third Season 4 months	Total Area
0.20	0.20	0.20	0.60 Hectares

(Source – Minor Irrigation Department of Baramati Tehsil)

6) Rabbi Block:

Table-1.6: Rabbi season

Rabbi	Total Area
	0.60 Hectares

(Source – Minor Irrigation Department of Baramati Tehsil)

In this way the British Government forced farmers to carry on their farming, due to which increase in agricultural yield was noticed and the lifestyle of the people also changed, because of their improved economic condition. Even today, Maharashtra Government supplies water in this way, and meets the need of the area under agricultural use.

Types of Irrigation:

It may be noted that the systems of irrigation developed in different parts of Baramati are governed by local meteorological, geological, and other physical conditions. Therefore, there cannot be any

uniformity in the system of irrigation in different areas. Most of the northern part of Baramati comprises hilly region. Many tanks are seen in this northern part area. About 79 villages (2001 Census) come under this area. The southern part of Baramati comes under plane area due to which it benefits from Nira left canal. About 43 villages come under this area. The number of wells, tanks etc are less in the northern part than in the southern part.

Wells:

As per the survey of Baramati Tahsil in 2005 -06, there were 17525 wells. Out of which 17312 were operated by oil engines and electric pumps. Out of the total irrigated area in Baramati Tahsil, 66.20 percent area is irrigated through wells. The northern part of Baramati has many wells. Between Nira river which is flowing on southern border of Baramati Tahsil and Nira left canal, there are 5550 wells, and the remaining 11762 wells are present in dry areas.

Canal Irrigation:

There are two canals present in Baramati Tahsil. The canal which flows from southern part is known as Nira left Canal and that which flows from the northern part is known as Khadakhwasla canal. Around 13 percent of area is irrigated with the help of these two canals. Nira left canal was constructed in the year 1882, whose length was 101 miles. Total cultivable area in Nira left canal area of Baramati Tahsil is 21149 hectares out of which 13534.75 hectares are irrigated area. A total of 43 villages benefits from these canals in Baramati Tahsil. Khadakhwasla Canal was constructed in the year 1956. The length of this canal is 5 km in Baramati Tahsil. Total cultivable area under Khadakhwasla canal of Baramati Tahsil is 1000 hectares out of which 750 hectares are irrigated. Three villages benefit from this canal in Baramati Tahsil. These villages are Shirshuphal, Paravadi and Nimbodi.

Tank Irrigation:

In Baramati 2 percent agricultural area is irrigated through tank water. The water supply to northern regions is through the tanks. In Baramati Tahsil there are 7 tanks out of which 5 tanks are government tanks and 2 tanks are private tanks. The minor government tanks are as follows.

a) Shirsuphal Minor Irrigation Tank:

The biggest tank in Baramati Tahsil is Shirsuphal minor irrigation tank. This project was completed during British rule during the years 1876 –1878. About 1254 hectares agricultural land depend on this tank. Out of this 1008 hectares are cultivated, while 1000 hectares are irrigated. Along with Baramati Tahsil, a few villages in Daund Tahsil such as Khadki, Ravangaon, Chincholi also benefit from this tank. Later another tank at Waki was constructed. About 328 hectares are irrigated with the help of this tank and Jalgaon Supe contains another tank which was built with the help of minor irrigation department. Twenty-nine hectares are irrigated through this tank.

b) Percolation Tank:

The main objective behind constructing percolation tanks is to increase ground water and water level of wells. The percolation tank project was started in 1972, when drought condition was worst in Baramati Tahsil. Today there are 289 percolation tanks in Baramati Tahsil and in future this number will increase.

Lift Irrigation:

Water supplied to a higher level with the help of electric pumps and oil engines from the water resource such as wells or rivers is called lift irrigation. The southern side of Baramati is irrigated largely by electric pumps fixed on rivers. But the northern side has a smaller number of sources of irrigation, due to which it totally depends upon rainfall. The important project, known as Janai Shirsai lift irrigation Project was carried out to develop the agricultural area.

a) Janai – Shirsai lift Irrigation Project

In the year 1993 Maharashtra Governments Irrigation Department proposed the Janai Shirsai lift irrigation Project to supply water to drought-prone areas of Daund, Baramati, and Purandar Tahsils. By lifting water from Khadakhwasla canal, out of which Janai lift Irrigation project is to be carried out from Varvand tank and the Shirsai lift Irrigation project is to be carried out from Shirsuphal tank.

b) Shirsai lift Irrigation Tank

In the year 1993 the project of lifting water from Khadakhwasla Canal to Shirsuphal tank was implemented to supply water to non-irrigation area in Baramati Tahsil from Shirsuphal tank. Shirsai left Irrigation system has eight motors, each of 675 hp. At a time seven motors work. The length of right canal is around 10 km, and the left canal is 13 km. Right canal is again divided into two sub canals out of which right sub canal is 14 km and left sub canal is 15 km. The Delivery chamber placed on canal divides water supply into two sub canals. Out of the total non- irrigated area of 5727 hectares is irrigated in Baramati Tahsil with the help of this lift Irrigation. Today, due to this canal we can see the change in the agricultural development in this area.

Table -1.7: The Villages and their areas in Baramati Tahsil under Shirsai lift Irrigation project.

Sr. No	Villages	Area in hectares
1	Undavadi- Supe	412.95
2	Karkhel	208.04
3	Sonwadi- supe	653.45
4	Anjangaon	404.76
5	Kharadewadi	45.05
6	Jalgaoan Supe	183.00
7	Sabalewadi	475.95
8	Undawadi Kadepathar	519.25
9	Jaradwadi	208.11
10	Barhanpur	450.26
11	Gojubavi	169.07
12	Medad	201.23
13	Shirsuphual	515.80
14	Gadikhel	386.35
	Total	4833.27

(Source – Minor Irrigation Department of Patas, Daund Tehsil)

c) Janai lift Irrigation Project:

This project includes lifting water from Khadakwasla canal to Varvand tank and then supplying water to non-irrigated areas in Baramati Tahsil. Lift irrigation system has pump house. Water from two lines of Janai-Udharn pipe in which block one is around 1500 mm diameters, goes to Janai block one and from Janai block two, Kusegaon Branch canal of 10 km length is extended. Janai block two contains seven pumps of 1000 hp each. Water from two lines of Janai Udharn blocks are around 1500 mm in diameter pipe which is put into deliver-container.

1) which discharges into Padavi branch canal 8 Kms

2) Janai left canal 9 km and Tail delivery 7 km

3) Further from Janai left canal which is about 6 km another branch of 14 km runs called as Hingnigada branch.

4) Janai Right canal is about 22 km, and all extended work is completed other than Mayureshwar forest area. Janai block 3 work is in progress. From this, Purander canal of 12 km is constructed, but distribution system is under construction. Total irrigated area presents on Janai left Irrigation project is 7173.98 hectares in Baramati Tahsil. The villages irrigated are as follows:

Table -1.8: Janai Lift Irrigation Project

Sr. No	Villages	Area in Hectares
1	Naroli	460.00
2	Kololi	620.00
3	Deuelgaon Rasal	575.00
4	Karhati	450.00
5	Baburdi	360.00
6	Sherewadi	292.05
7	Kalkairewadi	890.10
8	Supe	1005.98
9	Dandwadi	1769.96
10	Pansarewadi	750.89
	Total	7173.98

(Source – Minor Irrigation Department of Patas, Daund Tehsil)

Activation of this canal was started on 20-11-2000 and the work of these canals has been completed.

Minor Irrigation Project

Tank irrigation, percolation tank, lift irrigation, tube wells, K.T. weir are included under the minor irrigation project in Baramati Tahsil. K. T. weirs are built where there is flow or depth in the river and where there is strong base. Many minor irrigation systems are built on Nira and Karha rivers in Baramati Tahsil.

K. T. weir Built on Nira River

Nira is the biggest river which flows from Baramati Tahsil, and which fully irrigates the southern part of Baramati. There are 10 K. T. weirs built on Nira river through the Minor Irrigation Department, due to which 2664 hectares are irrigated. Owing to the K. T. weirs, 10 villages are under irrigation. The K. T.

weirs built on Nira river are as follows.

Table -1.9: Irrigated area under K. T. weirs

K. T. weir Name	Irrigated area (hectares)
Late	213.00
Korhale Kd	368.5
Kambaleshwar	225.00
Shiravali	246.5
Gitewasti	254.00
Ghadgewadi	343.00
Nira wagaj	339.5
Hol	202.00
Murum	490.00
Nimbut	235.0

(Source – Minor Irrigation Department of Malegaon Bk.)

On Nira river, five extra locations have been chosen to build minor irrigation dam and this project is likely to be completed by next year to meet increased demand of water and to supply water to drought-prone areas of Baramati Tahsil.

K. T. weir built on Karha river:

Karha river is a tributary of Nira river which flow through drought-prone areas of Baramati Tahsil. The K. T. weirs built on Karha river help to a small extent, to eradicate famine from some drought-prone villages. Thirteen K. T. weirs irrigate 947.95 hectares of area of Baramati Tahsil.

Table – 1.10: K. T. weir built on Karha river.

Sr. No.	Name of K. T. Weir	Irrigated area (hectares)
1	Malwadi	24.50
2	Karahati	108.20
3	Fondwada	23.40
4	Foundwada (Jagtapvasti)	90.95
5	Jalgaon K. p	22.50
6	Jalgaon supe	103.70
7	Karhavagaj	52.20
8	Anjangaon	127.45
9	Nepatwalan	52.00
10	Barhanpur	140.70
11	Medad	55.30
12	Gunawadi	29.70
13	Songaon	116.35
	Total	947.95

(Source – Minor Irrigation Department of Baramati Tehsil)

Modern Techniques of Irrigation:

In Israel, there is high scarcity of water. Therefore, there was no other way than to use water carefully and efficiently. Israel developed new techniques to provide water to crops in such a way that there will be no wastage of water and there will be a high percentage of yield. This popular technique is known as Drip and Sprinkle irrigation. Around 1/3 area of our county is drought-prone and Baramati is one of the high drought-prone areas in Pune district. Today, drip irrigation is used to a large extent in Baramati Tahsil. Nearly 142.88 hectares of area is under drip irrigation. Out of this, 15.49 hectares of area comes under non-fruit production and 127.39 hectares of area comes under fruit- production. Out of 15.49 hectares of non-fruit production area 13.23 hectares are under drip irrigation. For sugarcane, grapes and the remaining Tuti crops. In horticulture production area, 64.38 hectares make use of drip irrigation. Drip irrigation is used for Grapes (30.66 hectares) Bananas, Pomegranates (8.45 hectares) and Custard apple (6.20 hectares).

Drip Irrigation in Baramati Tahsil:

Today drip irrigation is used to a large extent in Baramati Tahsil. Around 142.88 hectares area is under drip- irrigation. Of the total number of 306 drip irrigation units, 270 drips are present in fruit-production area. The remaining 36 are present in non-fruit production area in Baramati Tahsil.

Role of Irrigation in Agriculture:

Irrigation has proved beneficial to Baramati Tahsil and has formed the datum line for sustained successful agriculture. It alleviates suffering, preserves life, averts famines, and advances the material prosperity of Baramati Tahsil. Nira left canal, Tube wells, wells in Baramati have shown that the direct and indirect effects of the irrigation projects have been very beneficial. Owing to irrigation, farmers could make additional investments in cattle, farm implements and on cash crops like sugarcane and fruits leading to increase in employment of the farmers and laborers. It was observed that, “canal Irrigation has helped in promoting the greater utilization of land, enlarging the average size of the farm, generating demand for additional farm labor, shifted on to additional productive investment in farm business. Favorable input-output ratio, widening the scope for increase in land- revenue and other local receipts. In addition to direct benefits there are also secondary and tertiary benefits e.g., canal and lift irrigation which has led to general expansion of secondary and tertiary activities in the area affected by it resulting in greater work opportunities, more employment to both family and hired labor, higher turnover of business establishment in the project area.” The purpose of irrigation is to increase agricultural production from the land served. The services provided by irrigation may be viewed from two angles viz.

1. Protective aspect to make up the moisture deficiency in soils during the cropping season to ensure proper and sustained growth of the crops grown.
2. Additional land-use aspect enables a second or third crop being raised on the lands provided with irrigation which could otherwise not be cultivated efficiently, more particularly, during the post or pre- monsoon periods.

While the protective aspect helps in stabilizing agricultural production against droughts, the second facility cannot be neglected by an intelligent and responsible agriculturist. Irrigation has also a third aspect and that is of changing soil sterility caused by dryness or excessive water supply. Irrigation development in Baramati in the past had mostly taken place as a measure of drought relief. Famines fathered the idea of artificial irrigation. Irrigation works were built designed and a prated mostly on a defensive pattern with the

population swelling rapidly. Irrigation has now come to have a new purpose of increasing agricultural production.

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