

## Source of Surface Irrigation in Marathwada Region: A Geographical Analysis

**Dr. M. T. Musande**

*Head, Department of Geography,  
Jawahar Arts, Science and Commerce College,  
Anadur, Tq. Tuljapur, Dist. Osmanabad (MS)*  
**musandemt@gmail.com**

### Abstract

*Water is an important component of the life support system. Unfortunately water has been overused and even abused over the centuries. But in the study area water resources are imbalanced with the reference to ground and surface water based on irrigation development and water supply. The overall stage of ground water development in the state is above 30%, despite being predominance hard rock with difficult hydrological and meteorological condition. Considering the population growth and inevitable fresh water, the seriousness of the issue man faces becomes obvious in the study area Osmanabad, Jalna, Beed, districts finds lack of rainfall and mismanagement of water resource. In this connection I would like to geographical study of minor irrigation schemes in Marathwada region.*

**Keywords:** Water sources, Ground water, minor irrigation schemes.

### 1. Introduction

Irrigation is essentially the artificial application of water to overcome deficiencies in rainfall for growing crops (SivaramaKrishnarao and M. I. Ali, 1986). This could be done by artificial application of water to land for growing crops and is known by the term "irrigation". Irrigation in one form or another has been in vogue from time immemorial. For instance, in Egypt, it goes back to 400 B.C. or beyond and other parts of the world it is equally old and is described, often in great detail, in ancient literature such as the Rigveda or the records of ancient travelers

  
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and traders. It is developed in response to conditions of climate, and the same holds good today in many parts of the world(Cantor L. M., 1967). Irrigation is regarded as an integrated part of a sound infra-structure and is one of the basic in gradient of agricultural activities. To be successful and well developed agriculture requires supply of water at regular interval and in required quantities.

Irrigation is a pre-requisite for the adoption of new technology in agriculture and for the rapid growth of agricultural sector. The conversion of dry land into wet land, provides, security against the vagaries of rainfall, preventing crop failure and enabling higher yield per hectare. It also helps to the farmers to take two or more crops from the same field within a year and it increases the productivity of the land, by transforming the agriculture (Gajhans D. S. and Suryawanshi M. T., 2012).

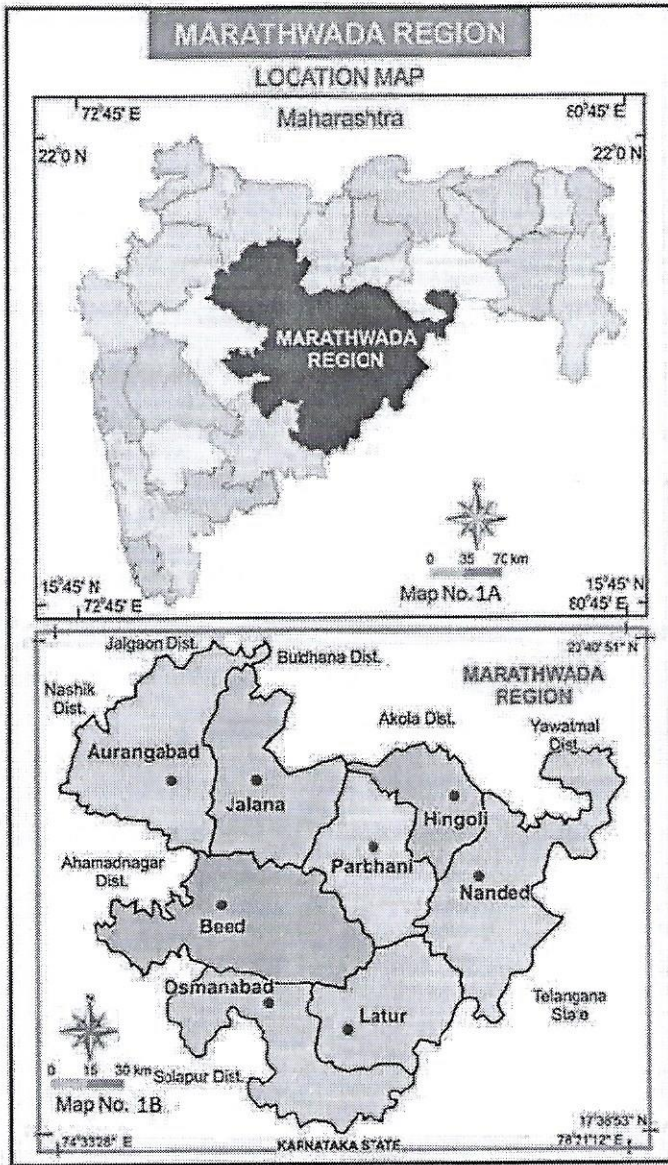
Irrigation leads to changes in cropping pattern, increases yield rates and labour utilization and in the ultimate analysis bring prosperity for socio-economic change that sets motion the productive forces in the agricultural sector(ChatterjeeNandini, 1995). Irrigation appears to be the most basic inputs as HYV seeds consume more water in adequate and timely does a thing not possible in rain fed agriculture(Rudder Dutta and Sundaram K.P.M.,1997).

## 2. Study Area:

The Maharashtra State is administratively divided into six divisions, viz. Konkan, Nasik, Pune, Amravati, Nagpur and Aurangabad. The Aurangabad division is also known as Marathwada was formerly a part of Hyderabad state. Marathwada forms the South central portion of Maharashtra with Aurangabad city being located almost at the centre of the state (Map 1).



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Marathwada is one of the most backward regions of Maharashtra state. The Marathwada region lies in the upper Godavari basin. The absolute location of region is 17°38'53" North latitude to 20°40'51" North latitude and 74°33'28" East longitude to 78°21'12" East longitude. The study region is bounded to the north by Jalgaon, Buldhana, and Washim districts, to the north east by Yavatmal district to the east by Nizamabad and Adilabad districts of Andhra Pradesh to the south and south east by Bidar and Gulbarga districts of Karnataka state, to the west by Ahmednagar to the Southwest by Solapur and to the North West by Nasik district. Its shape is roughly triangular. East-West maximum

extension of region is 394 Kilometers and North-south extension in of region is 330 Kilometers. Total Geographical area of region is 64434 Square Kilometer which is 20.95 per cent of the state and its population is 1.87 cores which is 16.66 percent of the state as per census of 2011. Administratively study region is divided into eight districts that are further divided into 76 tahasils.

### 3. Objective:-

The main objectives of this paper is analyses to sources of surface irrigation in Marathwada region.

### 4. Data collection and Methodology:

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The present study is based on secondary data source. Data collected from Socio Economic Review and District Statistical Abstract of Districts in Marathwada region. For the statistical analysis various techniques and methods will be applied. For this study statistical data are taken to 2010-11.

## **5. Discussion:**

### **5.1 Surface Irrigation**

The surface irrigation consist of Canal, Lift and Tank irrigation, surface irrigation is very important in study region, because rainfall variability is more than 20 percent all over Marathwada region. Before analyzing surface irrigated area the source of the surface irrigation discussed in the light these are the Major, Medium and Minor irrigation projects.

### **5.2 Source of Surface Irrigation**

There are different irrigational sources in Maharashtra state. The following are the sources of surface irrigation in study region.

- A) Major Project.
- B) Medium Irrigation Projects.
- C) Minor Irrigation Scheme.

#### **A) Major Irrigation Projects**

An irrigation project which covers more than 10,000 hectares as the cultivated command area is called major irrigation project. The major irrigation projects are essential for the all round development of the region. Major irrigation project can change the socio-economic structure of the region.

There are ten major projects in Marathwada region. Jaykwadi, Majalgaon, Manjara, Purna (Yeldari), Upper Panganga, Manyar, ShankarraoChavan (Vishnupuri), Lower Dudhana, Lower Terna, Lower Godavari Lendi, are the important major projects of the Marathwada region.

#### **1. Jaykwadi Project**

Jaykwadi, the major irrigation project is constructed on Godavari River at the site of Jaykwadi village in Paithantaluka of Aurangabad district in Maharashtra state.

A plan to build a dam on Godavari River in the drought-prone Marathwada region was first conceived during rule of state of Hyderabad. The project came to know as Jayakwadi project after name of the village. The plan was to build a dam in Beed district near village Jaykuchiwadi with storing capacity of 2,147 Mm<sup>3</sup>. However, after formation of new state of Maharashtra and comparative analysis on alternative places, it was decided to build a dam 100 km upstream at Paithan. The name of project is not change even after it was shifted to a new location. The foundation of the dam was laid by the Prime minister of India LalBahadurShastri on 18 October 1965. The dam was inaugurated on 24 February 1976 by the Prime Minister Indira Gandhi. Construction of dam at higher level made it possible to have longer canals and thus providing irrigation facility to a larger region.

The Jayakwadi project is one of the largest irrigation projects in the Maharashtra. It is a multipurpose project. The water is used mainly to irrigate agricultural land in the drought-prone area of Marathwada region. It also provides water for drinking and industrial usage to nearby towns and villages and to the municipalities and industrial areas of Aurangabad and Jalna district. Its height is 37.73 m and length is 10415 m (10 km approx) with total storage capacity 2,909 MCM. NathSagarJalashay is the name of the reservoir formed by Jayakwadi Dam.

Irrigation Potentials of Jayakwadi Dam is 203960 hectares and the districts of Aurangabad, Jalna, Beed and Parbhani are benefited by this project. The length of left bank canal is 208 kilometer and the length of right bank canal is 132 km. The total cultivable command area is 183,560 hectares. But in 2010, actual area irrigated by this project is 177220 hectares.

## **2. Majalgaon Dam**

Majalgaon Dam is an earth fill dam on the Sindphana River near Majalgaon in Beed district of Maharashtra state.

Majalgaon Dam and Majalgaon Right Bank Canal are components of the Jayakwadi Project Stage II. A dam has been constructed across the Sindhaphanariver, which is a major tributary of the GodavariRiver, also known as Dakshin Ganga. The project was approved by the government of Maharashtra in 1976 for an estimated cost of Rs 5433 lakhs.

The height of the dam from its foundation is 31 meter while the length is 6,488 m. gross water storage capacity behind the dam is 454 MCM. The dam have three hydroelectric generators,

each capable of generating 750 kilowatts. The length of canal is 101 kilometers. The irrigated potential is 35711 hectares, but in 2010 actual area irrigated by this project is 4709 hectares. The Beed, Parbhani and Nanded districts are benefited by this project.

### **3. Manjara Project**

Manjara project is an Earth fill dam constructed on the Manjara River near Kallamb in Osmanabad district. The project was approved by the government of Maharashtra in 1976 and work is completed in 1984. The height of the dam from its foundation is 25.50 meter. Maximum storage capacity of this project is 224.093 million cubic meters and irrigation potential area are 45621 hectares, but in 2010, actual area irrigated by this project is 22799 hectares. The Beed, Latur and Osmanabad districts benefited by this project.

### **4. Purna Project**

The Purna Dam is constructed on Purna River near Yeldari in Jintur Taluka of Parbhani district in the state of Maharashtra in 1968. It was built for Irrigation and small hydroelectric project. The height of the dam is 38.26 Meters while the length is 4,432 Meters. The maximum storage capacity is 250.85 MCM.

The total length of canal is 43.5 kilometers and irrigation potential is 22658 hectares, but in 2010, actual area irrigated by this project is 18059 hectares. The Parbhani and Nanded districts are benefited by this project.

### **5. Vishnupuri Project**

Constructed on the river Godavari, this is one of the largest lift irrigation projects in India. As well as in Asia sub-continent located on Godavari river. This project is named as Dr. Shankarrao Chavan Vishnupuri Project. The project is situated near Asarjan village, at about 8 kilometer from Nanded city. The project was completed in the year 1990. The back water covers 40 kilometers length of the river Godavari. The maximum storage capacity of this project is 83.47 Million cubic meters out of which 43.95 Million cubic meters storage is reserved for drinking purpose for Nanded city and 10.26 Million cubic meters storage is reserved for Industrial purpose. The cultivable Command Area of this project is 37662 Hectares and irrigation potential are 41461 hectares, but in 2010, the actual area irrigated through this project 12527 hectares. The command area of this project is in Nanded, Kandhar and Lohatalukas of Nanded district.

**6. Lower Dhudhana Project**

The Lower Dhudhana project is an Earthen dam constructed on the Dhudhana River near Bramhawakadi village of Selutahasil of Parbhani district. The project was completed in the year 2012. The height of the dam is 28.60 meters from its foundation. Maximum storage capacity of this project is 290.9 million cubic meters and irrigation potential area 103853 hectares, but in 2010 actual area irrigated through this project is 43777 hectares. The Parbhani and Jalna districts are benefited by this project.

**7. Lower Godavari Lendi Project**

The Lendi project is a joint project between, the states of Maharashtra and Andhra Pradesh and the reservoir is proposed in Maharashtra State on Lendi River, near Golegaon village of Mukhed Taluka of Nanded district. The height of dam 27.43 meters, maximum storage capacity is 154.14 MCM. and irrigation potential is 32410 hectares. The cultivable command area is 28286 hectares. The proposed length of Canal is 45 Kilometers. The work of dam is in progress and Land acquisition work in Maharashtra is also in advance stage. The Canal surveys in Maharashtra and in Andhra Pradesh are in progress.

**8. Lower Terna Project**

The lower Terna major irrigation is located on river Terna, a tributary of River Manjra near village Makani of Osmanabad district of Maharashtra.

Earthen dam 3604 meter long with maximum height of 26.30 meter. The total length of canal is 154 kilometers. The maximum storage capacity is 121.18 MCM. The irrigation potential of these projects is 15600 hectares and cultivable command area is 14513 hectares, but in 2010, actual area irrigated by this project is 7096 hectares. An addition lift irrigation scheme at Ashivis completed in the year of 1989 but at present canal linking work is going on cultivable command area of this project is 4740 hectare. This irrigation project consists of 5 pumps house to lift water in five stages and the total static head is 130 meter. The Latur and Osmanabad districts will be benefited by this project.

**9. Manar Project**

The Upper Manar Major Irrigation Project is being constructed in the Godavari basin in Nanded district of Maharashtra.

The length of Manar major irrigation project is 953.75 meter with the maximum height of 26.80 meter. The total length of canal is 89 kilometers then maximum storage capacity is 146.92 MCM. The irrigation potential is 33822 hectares and cultivable area is 24715 hectares. But in 2010, the actual area irrigated through this project is 9205 hectares.

Table N.o. 1: Major Irrigation project.(As on March 2011)

Sr. No	Particular	MAJOR PROJECT				
		Jayakwadi	Majalgaon	Manjara	Purna	Manar
1	Name of River	Godavari	Sindhphana	Manjara	Purna	Manar
2	Location of the project	Paithan	Majalgaon	Kallam/	Yeldari	Kandar
3	Year of Completion	1976	1985	1984	1968	1968
4	Height of Project in Meters	37.73	31	25.5	38.26	26.8
5	Total Length of canal in K.M.	340	101	168	43.5	89
6	Maximum storage capacity Mill. Cubic meters	2909	454	224.09	250.85	146.92
7	Gross area commanded in hectares	203960	35711	45621	22658	33822
8	Cultivable area commanded in hectares	183560	9400	23690	33253	24715
9	Irrigable area by completed Project in H.	187631	35711	45621	22658	23310
10	Area irrigated in 2010	177220	4709	22799	18055	9205
Sr. No	Particular	MAJOR PROJECT				
		Vishnu-puri	Lower Dhudhana	Lower Terna	Lower Godavari	
1	Name of River	Godavari	Dudhana	Terna	Lendi	
2	Location of the project	Asarjan	Bramha-wakadi	Makani	Golegaon	
3	Year of Completion	1990	2012	1989	Incomplete	
4	Height of Project in Meters	9	28.60	26.3	27.83	
5	Total Length of canal in K.M.	49	122	154	45	
6	Maximum storage capacity Mill. Cubic Meter	83.47	2909	121.18	145.14	
7	Gross area commanded in hectares	41461	103853	15600	32410	

  
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8	Cultivable area commanded in hect.	37662	115200	14513	28286
9	Irrigable area by completed Project in H.	28340	97400	11610	26924
10	Area irrigated in 2010	12527	43877	7096	N.A.

Source: Socio-Economic review and district statistical Abstract of Aurangabad, Beed, Hingoli, Jalna, Latur, Osmanabad, Nanded, Parbhani district of Marathwada – 2010-2011.

## 5.2 IRRIGATION POTENTIAL AND ITS UTILIZATION

The table no. 2 indicates that the Marathwada region as a whole as 577719 hectares irrigation potential in 2010-11. But spatial distribution is very uneven ranging from 30295 hectares to 206487 hectares. The highest irrigation potential was found in Aurangabad districts. The low irrigation potential was recorded in Jalna, Beed, Parbhani, Hingoli, Osmanabad, Latur and Nanded district i.e. below 89000 hectares.

**Table No. 2: District-wise Irrigation Potential created by Major Irrigation Projects and its Utilization in Marathwada Region,**  
(on 31st March 2011)

District	Irrigation potential in hectares	Utilization of irrigation potential in hectares
Aurangabad	206487	161740
Jalna	45178	36619
Beed	74190	66172
Parbhani	44417	28698
Hingoli	48315	46348
Nanded	84312	18350
Latur	30295	21682
Osmanabad	44225	19513
Marathwada Region	577719	399122

Source: Socio-Economic Review and District statistical abstracts of Aurangabad, Jalna, Beed, Nanded, Parbhani, Hingoli, Latur and Osmanabad 2010-2011.

The table no. 2 also indicates that the Marathwada region as a whole as 399122 utilization of irrigation potential in 2010-11. The spatial distribution varies from district to district. The high


utilization of irrigation potential was found only in Aurangabad district i.e. 161740 hectares. The moderate utilization of irrigation potential was registered in Beed district, while low utilization of irrigation potential was recorded in Jalna, Nanded, Parbhani, Hingoli, Latur and Osmanabad district i.e. below 66000 hectares.

**B) Medium Irrigation Projects**

Medium irrigation projects are those which have cultivable command areas in between 2000 and 10,000 hectares (Rudder Dutta and Sundaram K. P. M., 1997). Table 3 indicates that there were 78 medium projects in Marathwada region as on 31st March 2011. 1729.68 cores amount was spend in 78 medium projects up to March 2011. Some of the projects are under construction. The spatial distribution of medium project varies from district to district.

**Table No. 3: Statement showing number of Medium Project in Marathwada Region. (31st March 2011)**

District / Region	Number of medium projects	Expenditure in Rs.Cores	Name of the Medium Project	Storage Capacity (T.M.C.)	Irrigation potential in hectares
Aurangabad	17 21.79%	396.86	Wakod, Shivana, Dheku, Khelna, Kohli, Sukhana, Gadagad, Lahuki, Ambadi, Girja, Ajintha, Purna, Tembhapuri, Bordahegaon, Narangi, Anjana, Brahmavhan	225.66	26064
Jalna	07 8.97%	3.51	Jui, Upper Dudhana, Galhati, Jivrekha, Girja, Dhamana, PirKalyan.	78.34	2547
Beed	10 12.82%	61.61	Bindusara, Bodhegaon, Wan, Belpara, Mahasangvi, Sindhafana, Saraswati, Borna, Kundalika, Waghebabhulgaon,	127.55	29900
Parbhani	05 6.61%	385.27	Kapara, Masoli, Digras, Mudgal, Muli.	139.11	5881
Hingoli	00	00	-Nil-	0	0
Nanded	10 12.82%	633.57	Karadkhed, Kudala, Kuda, Pethwadaj, Mahalinji, Upper Limboti, Nagzari, Loji, Takli, Dongargaon.	305.46	5180

  
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Latur	11 14.10%	138.57	Gharni, Tiru, Tavarja, Aurad, Girakchal, Sakol, Vhati, Masalga, Devarjan, Renapur, Mogha.	152.21	18737
Osmanabad	18 23.08%	110.29	Turori, Rui, Raigaon, Benetura, Tema, Khandala, Kurnur, Harni, Chandani, Khasapur, Khandeswar, Ramganga, Banganga, Jekekar, Wagholi, Sakat, Sangameshwar, Palasnilegaon,	228.27	28579
Marathwada Region	78 100%	1729.68	As mentioned from Aurangabad to Osmanabad	1256.6	116858

Source: *Socio-Economic Review and District statistical abstracts of Aurangabad, Jalna, Beed, Nanded, Parbhani, Hingoli, Latur and Osmanabad 2010-2011.*

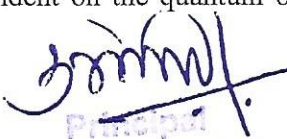
The high concentration of medium projects is found in Osmanabad and Aurangabad district i. e. above 17 percent. It is moderate in Beed, Nanded and Latur district i.e. ranging from 12 to 17 percent, while it low in Jalna and Parbhani district. There is not a single medium projects in Hingoli district due to unfavorable geographical condition.

The water storage capacity of the said projects is 1256.60 TMC. Most of the medium projects in the Marathwada region are not fully filled during the monsoon season. Sometimes they become overflow in rainy season. Sometimes they are having very little water in summer season due to the shortage of monsoon rainfall.

The table 3 exhibits that the Marathwada region as a whole has 116858 hectares irrigation potential by medium projects. The irrigation potential varies from district to district in the study region. The low irrigation potential is found in Jalna, Parbhani and Nanded district i.e. below 9967 hectare. It is moderate in Latur district, whereas it is high in Aurangabad, Beed and Osmanabad district i.e. above 19434 hectares.

### C) Minor Irrigation Schemes

The irrigation project, which covers less than 2000 hectares cultivated command area is called minor irrigation project (*Rudder Dutta and Sundaram K. P.M., 1997*). During the rainy season when water collects and forms a pond, it is usually called a tank. This water is used for irrigation for standing crops after the wet season. Tank irrigation, therefore, needs much rainfall for later storage and utilization. Level of water in tanks is solely dependent on the quantum of

  
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Surface irrigation and well irrigation play important role in the changes in agricultural productivity. Study region benefited by ten major irrigation projects. Jayakwadi and Manjara irrigation project plays a very important role in the development of agriculture. Jayakwadi Dam have highest irrigation potential i.e. 203960 hectares which is favorable to increase agricultural productivity of Aurangabad, Jalna, Beed and Parbhani district. This project has changed the agricultural productivity of the study region largely. The high irrigation potential in Aurangabad district is mainly due to major projects. There are 78 medium irrigation in the study region but high concentration medium projects are in Osmanabad and Aurangabad district. In the study region, there are 5439 minor irrigation works. Maximum proportion of irrigated potential by minor irrigation works is found in Latur district. Most of the minor irrigation schemes become dry in summer season due to rate and distribution of the monsoon rainfall which effects on the water storage capacity of the project.

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