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## AREA WISE WATER RESOURCE PROVISION FOR CULTIVATION: MICRO LEVEL STUDY OF MOHOL TAHSIL IN SOLAPUR DISTRICT



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### ABSTRACT:

Irrigation constitutes one of the most effective technical means of the raising agricultural production in the developing countries. Irrigation is essential for successful agriculture particularly in the area, where rainfall is inadequate uncertain, and unpredictable. Irrigation is identified as a decisive factor in Indian agriculture due to high variability and inadequacy of rainfall. Irrigation is necessary in traditional agriculture to overcome droughts scarcity of rainfall so the main aim of this research paper is, to analyze, region wise relative requirement of water for agriculture at village level. Regionalization of study area has been done on the basis of decadal population growth and density of population per square km. Thus, ultimately evolved the nine micro regions. Further it works out that "Index of Irrigation Requirement" (Ir). There are 104 villages included in Mohol tahsil. Out of them 47 villages

having very low (Ir. < 0.15) requirement of water for agriculture, whereas 29 villages shows low (Ir. 0.15 – 0.30), 11 denotes medium (Ir. 0.30 – 0.45), 18 are high (Ir. 0.45 – 0.60) and 9 villages observed very high (Ir. 0.60 >) requirement of water for agriculture.

**KEYWORDS:** Regionalization, Mapping, Drought, Plateau.

### INTRODUCTION:

Water is a basic requirement of human being and is also the basis of all types of development. Water resource are the important for human being for agriculture, industrial, household, recreational and environmental purpose. Irrigation constitutes one of the most effective technical means of the raising agricultural production in the developing countries. Where irrigation by gravity is possible, much work of installing facilities can be carried out by manual labour, through there is an obvious economic advantages, even in countries with very low wage level, in using technical aids in the constructional and earth moving works where the water necessary. In rain shadow area like Mohol tahsil of Solapur district experienced deficiency of water resources for agriculture and even for drinking purpose. So, a systematically region wise study of requirement of water is needed at micro level or say village level. The majority of man's uses require fresh water. It is also predicted that conflicts between various societies, villages, states, and nations arise due to water resources. Bhong A.B., Nimase A.G., studied levels of agricultural productivity in Solapur district in Maharashtra,

### Study Area:

Mohol tahsil is located at eastern part of Solapur district in the state of Maharashtra. Mohol is surrounded by N.Solapur to the east. Madha tahsil to the North. Pandharpur tahsil to the west. Mangalwedha tahsil to the south-west, S.Solapur tahsil to the south-east. The study region cover 1408.40 hectares land and having population in 104 villages in 252526 as per 2011 Census. Mohol tahsil is located at the eastern part of Solapur district. It is too hot in summer. Mohol summer highest day temperature is in between 35°C to 43°C.

Average temperatures of January is 26 °C, February is 27 °C, March is 31 °C, April is 33 °C, May is 35 °C. Physiography, rainfall, soil, temperature, and drainage influences on agricultural land use pattern in this tahsil. Rainfall varies between 200 to 600 mms from east to west entire tahsil. The underline basalt on disintegration and decomposition brought varieties agencies had yielded three kinds of soils viz. Deep black, medium deep & shallow soils. Tahsil is provided with Neera and Man left bank canals. Similarly Sina and Bhogawati are two seasonal rivers at north side of the tahsil. The tahsil is divided in to 104 villages are as 51 Kharip and 49 villages are as Rabbi season. Including Eight centers of Revenue circle i.e. Penur, Shetphal, Begampur, Narkhed and Anagar.. Some villages are mostly unirrigated. The variation in amount of rainfall & type of soil exerts influence on the cropping pattern of the study region. The major crops namely cereals, cash crops, pulses, oil seeds, cash crops, fruit crops, vegetables; flower and fodder crops are cultivated in Mohol tahsil.

The topography soil and availability of water have significant effect on the population density and distribution. There are 104 inhabited revenue villages; all grouped into Eight zilha perished circles (ZP circles). The Administrative headquarter of the tahsil is at Mohol which is rural in character. Study area is as rural in character, situated in rain shadow zone, poor soil, undulating hilly area. Main occupation is agriculture but there is no sufficiently available water source for irrigation. As per 2011, only 20.56 percent cultivated area have been irrigated. There is low possibility in development of agriculture.



**OBJECTIVES:**

The main objective of this research paper is to light throw on Area wise provision of water resource for agriculture in Mohol tahsil of Solapur District.

**Data Base Methodology:**

The present research paper is entirely based on secondary source of data. The required data has been collected from the District Census Handbook, Solapur-2011. The information regarding physiography, drainage etc. obtained from SOI toposheets and gazetteers. Regionalisation of study area has been carried out on the basis of decadal growth of population and density per sq. km. Thus the study area identified as low (dg. <15%), moderate (dg. 15.01-30%) and high (dg. 30> %) growth regions. Further each growth region has been divided into three sub-regions according to the density of population < 100, 100-200 and 200> persons per sq. km. for the tahsil. Thus study area is evolved into the nine micro regions.

There are one hundred four villages in Mohol tahsil. Out of them fifty four villages includes in low growth region, twenty four in moderate and twenty six in high growth region. Further, the formula adopted for the 'Index of Irrigation Requirement' (Ir.) for agriculture in each village is as given below.

$$Ir = \frac{\text{Density of population per 100 hectares to TGA of that village}}{\text{Annual Rainfall} \times \text{Irrigation intensity or \% of area under irrigation to TGA.}}$$

**Need of Irrigation in Solapur District:**

There are imbalances in need of irrigation in Solapur district. The need irrigation in Solapur District is 6.16. The highest need of irrigation is observed in Madha tahsil (13.08) and lowest in North Solapur Tahsil (01.38). This coefficient of need irrigation is divided in to three groups. Nimase A.G. & Dr. Lokhande T.N. (Nov-2013) has focused on Cropping pattern and agricultural landuse in Mohol tahsil of Solapur district (MS).

**Table No 1: Requirement of water Resource in Solapur District**

Need of irrigation	Number of tahsil	Name of tahsil
High (Above 10)	06	Mangalwedha, South Solapur, Karmala, Madha, Mohol, Pandharpur.
Modrate (5 to 10)	04	Barshi, Sangola, Akkalkot, Malshiras
Low (Below 5)	01	North Solapur

Source: Compiled by Researcher

On the basis of index values of each villages of irrigation requirement, the study area have classified into five major groups as shown in the table no.2.

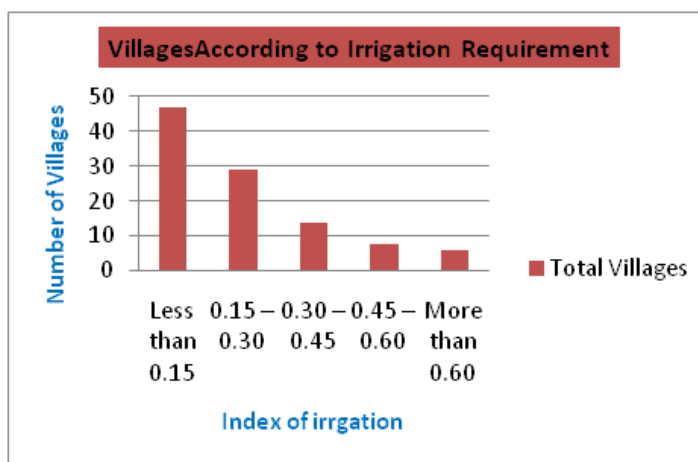
**Table No. 2  
Classification of Villages According To Irrigation Requirement**

Sr. No	Index of irrigation requirement (ir)	Total Villages	Requirement of water for agriculture
1	Less than 0.15	47	Very Low
2	0.15 – 0.30	29	Low
3	0.30 – 0.45	14	Moderate
4	0.45 – 0.60	8	High
5	More than 0.60	6	Very high

Source: Computed by Authors.

Mohol tahsil which circles like Penur ,Shetphal, Begumpur, Anagar and Narkhedand depend upon the socio-economic and physical conditions are the effect of land use and cropping pattern .With the use of agricultural equipment ,new technologies and are total cropping pattern of the tahsil get totally changed. ( Nimase A.G. & Dr. Lokhande T.N. (Nov-2013).

Table no. 2 clearly reveals that number of villages consisted in each growth region with level of requirement of water. It is investigated that 47 villages need very low requirement of water, 29 villages need low, and 14 need moderate, 8 needs high and 6 villages show need to very high requirement of water for agriculture. Detailed Information regarding these five categories is as below.



**1. Villages having very low requirement of water:**

There are forty seven Villages they need to be very low requirement of water are due to either low density of population on one hand and high proportion of irrigated area on the other hand. It is investigated from the obtained data that there are forty seven villages need very low requirement of

water. Out of them thirty four (50%) villages having low density ranges between 11 to 188 per hundred hectares to TGA and proportion of irrigated area ranges between 2.23 % to 28.06 % to cultivated area. Whereas, there are thirty four (50%) villages having high proportion of irrigated area ranges between 30.24 %to 96.37 % and density ranges 111 to 337 per hundred hectares to TGA. Villages of this category actually observed that index of irrigation requirement values having ranges between 0.02 to 0.15. Lowest index value of about 0.02 has been of Yewati and Penur, whereas it is highest of about 0.15 for Narkhed and savaleshwar kh. Other villages like, Morvanchi, Miri kh, kothale (each 0.03); kamati,Lamboti, Kolegaon (each 0.04 Sarole, Begampur, Kurul,Degaon, and Khandali, Ashti (0.05) having very low requirement

**Table No. 3: Region Wise Irrigation Requirements for Agriculture**

Growth region	Number of villages included in each growth region and in each level of Ir					
	Very Low	Low	Moderate	High	Very high	Total villages
1	06	02	01	01	02	12
2	12	06	08	01	01	28
3	05	03	00	04	02	14
Low	23	11	09	06	05	54
4	04	06	02	00	00	12
5	05	00	01	01	00	07
6	03	01	00	00	01	05
Moderate	12	07	03	01	001	24
7	05	04	01	00	00	10
8	03	05	00	00	00	08
9	04	02	01	01	00	08
High	12	11	02	01	00	26
Total	47	29	14	08	06	104

Source: Computed by Authors.

of water for agriculture. Comparatively above, high index of requirement in this category shows in villages like sarole, wadwal and Yewati with warkute , Waluj, Taratgaon Harya, Kasare (each 0.14); Penur, Padali Pophali, Konheri, jamgaon, Nandgaon,Baburdi, Dhotre kh. , Diskal, Waghunde Bk., and Papari (each 0.13) etc. In short, very low requirement of water have due to either low density or high proportion of irrigation whereas, very high requirement of water have due to either high density or very low proportion of irrigation

## 2. Villages having low requirement of water:

There are twenty nine villages they need to be low requirement of water. In this category of villages having low density of population ranges between 40 to 258 and area under irrigation between 4.15% to 28.4%. Ranges between 0.10 to 0.27 indexes value of irrigation is observed in this category. Village Ghorpadi shows as lowest 0.10 values and 0.27 as highest value found in Malikpeth and Takali. Other villages like that Warkute, Bk.Singoli Yenaki, wadval (0.16.);Khavani, Kamatibk.(0.17); Pokharapur, Devadi, Gotewadi Kurul, (0.18)Sultanpur,WadgaonSavtal(0.19)Bopale, Bitale, Ankoli (0.20);Ashti ichgaon (0.22); Lamantanda, watwate, pawarwdi, waluj (0.23); Pimpri jalsen, Mohol, Tikhol(0.25) and they shown comfortably availability of water resources. It is observed from table no. 2 that there are twenty six villages need low requirement of water for agriculture.

### 3. Villages having Moderate requirement of water:

There are eleven villages they need to be moderate requirement i.e. 0.31 to 0.44 index value of irrigation requirement of water. It is 0.31 have lowest value of irrigation requirement observed in villages like Palaspur, Nandur Pathar, Siddheshwarwadi, Loni Haveli, etc. Whereas, it is 0.44 have highest value of IR found in Bhalwani of this moderate category. Other villages show IR, as follows: Korawali, Kurul, lamboti-0.33, Kharkhatane-0.34, Mangaoli-0.36 Kinhi-0.37, Pasalewadi 0.40, Hivare, Katewadi-0.42, Nandgaon etc. included in this category in ascending order.

### 4. Villages having high requirement of water:

Villages About eight villages facing a problem of high deficiency of water for agriculture. Index values of IR found in ranges 0.46 to 0.60. Here 0.46 is the lowest value of IR. found in villages like Dadapur, Degaon, Bahire, and Punewadi and 0.66 has a highest value observed in village Garkhindi. Others are as follows: Chikhali and Ghatane -0.48, Nalbandwadi and Adhegaon -0.50, Siddewadi -0.55, Wagholiwadi-0.59 etc. shows that high requirement of water.

### 5. Villages having very high requirement of water:

There are nine villages they need to be moderate requirement Villages having very high requirement of water are either high density of population on one hand and very low proportion of irrigated area on the other hand. It is investigated from the obtained data that, there are twelve villages need very high requirement of water. In this category, villages show index value of IR. As follows: Hiradwadi-1.40 Galandwadi-1.32, Diksal-0.95, Bairagwadi-0.92, Aundhi-0.86 Gatewadi-0.84 Ajansond-0.82, Devadi, Hiware and Tambole-0.80 etc. They are facing very high deficiency of water for agriculture.

### CONCLUSION:

1. Moderate requirement of water experienced in that villages which are situated either remotely from Main River or on plateau or on table land.
2. High and very high requirement of water are either high density of population on one hand and very low proportion of irrigated area on the other hand.
3. Mohol tahsil which circles like Penur, Shetphal, Begumpur, Anagar and Narkhedand depend upon the socio-economic and physical conditions are the effect of land use and cropping pattern With the use of agricultural equipment, new technologies and are total cropping pattern of the tahsil get totally changed.
4. Further, it is also concluded that basically there are very low amount of rainfall and there is no big perennial river across the tahsil. Therefore, there is no available adequate and permanently source of water for irrigation to the development of agriculture.
5. Villages situated nearer to canal irrigation, river basin and other minor rivers or odha etc. have experienced very low and low requirement of water due to availability of water.

### SUGGESTIONS:

There is urgent need in Mohol tahsil to management and planning of utilization of water on one hand and conservation and protection of water resources to other hand. It is found that villages having moderate, high and very high requirement of water, and where low area under irrigation these villages can improve their irrigation Facilities through the below suggested measures.

1. Rules, regulation and charges on irrigation water should be restructured.



2. Small works such as tanks, Bandhara, and dug wells, lakes construction constitute the most important source of irrigation. So that attention may have to give towards construction of percolation tanks, and check dams on a watershed basis.
3. Today, it is experienced that farm ponds are useful for irrigation. Therefore, attention may have to given towards construction of these type of ponds at maximum numbers through the financial assistance by government wherever possible.
4. Attention may have given towards contour trenching, bench terraces, plantation of trees and grasses on slopes wherever suitable physical sites and operate programmes like various types of water harvesting etc.
5. People participation should be give vital importance.
6. Repairing of canals to avoid seepage essential.
7. It has been realized that amelioration of this drought prone tahsil can only carried out effectively by transfer of water from adjacent more richly endowed basins i. e. Yeoti basin to the all over area of Mohol tahsil in Solapur district. Some of the villages it is only possible actually with the help of lift irrigation due to high altitude

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