

Research Papers



**“REGION WISE REQUIREMENT OF WATER RESOURCES FOR AGRICULTURE
IN DROUGHT PRONE AREA OF PARNER TAHSIL, DIST-AHMEDNAGAR :
A GEOGRAPHICAL ANALYSIS”**

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ABSTRACT

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 have 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 work out that “Index of Irrigation Requirement”(Ir.). There are 131 villages included in Parner tahsil. Out of them 68 villages having very low (Ir. < 0.15) requirement of water for agriculture, whereas 26 villages shows low (Ir. 0.15 – 0.30), 15 denotes medium (Ir. 0.30 – 0.45), 10 are high (Ir. 0.45 – 0.60) and 12 villages observed very high (Ir. 0.60 >) requirement of water for agriculture.

Key Words: *Index of irrigation requirement (Ir.), Drought prone area, Plateau, Table land etc.*

INTRODUCTION :

Water is a basic requirement of human being and is also the basis of all types of development. So we can say it is a life. It is also predicted that conflicts between various societies, villages, states, and nations arise due to water resources. In rain shadow area like Parner tahsil of Ahmednagar 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.

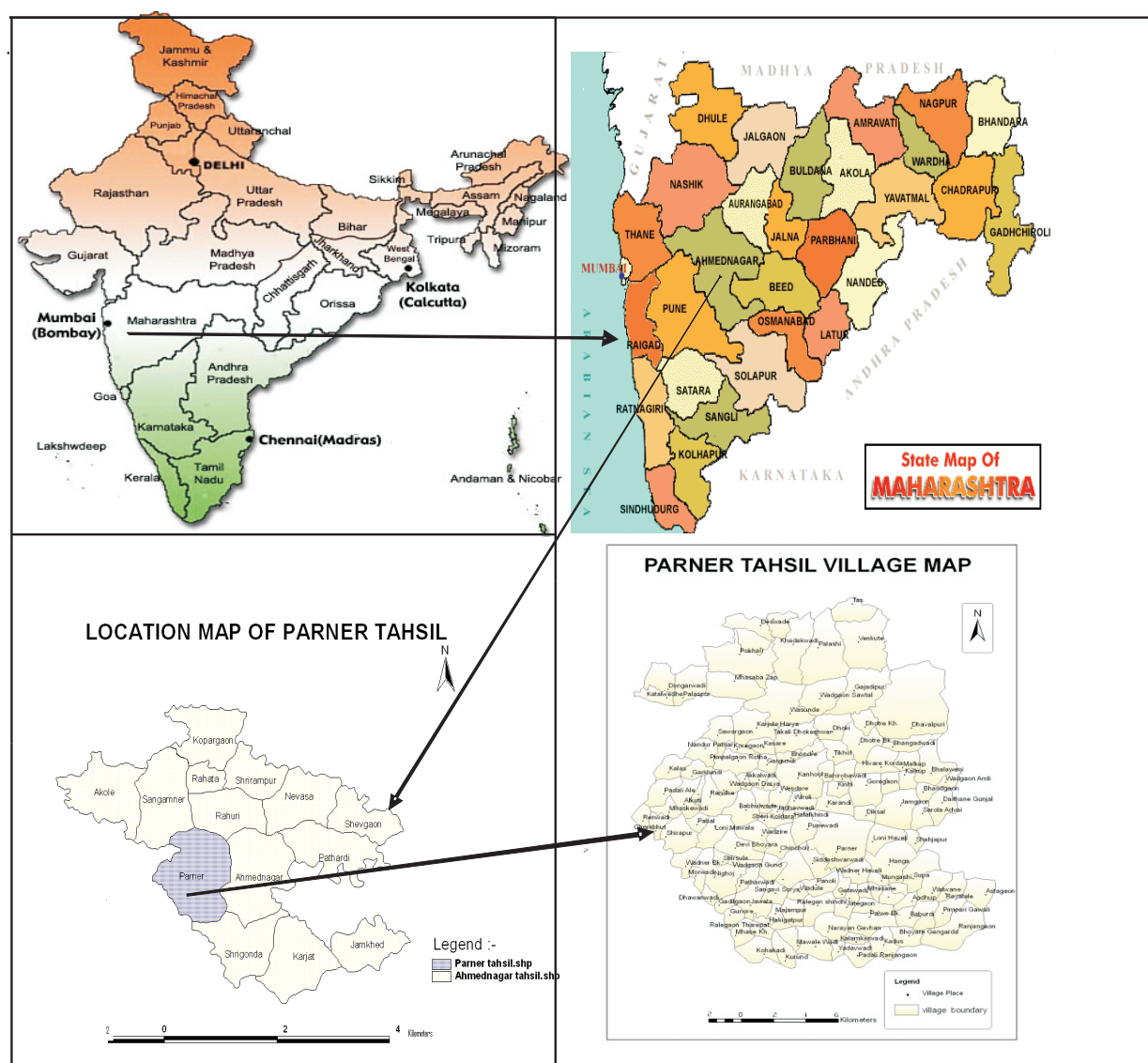
THE STUDY AREA :

The Parner Tarsal has been selected for the study to present research work. It is one of the 14 tassels of Ahmednagar district. Maps shows that exact location of the Parner tahsil within Maharashtra state as well as Ahmednagar district.

Climatologically, Parner Tahsil lies in the rain shadow or rain fed zone of Maharashtra state .Temperature found that ranges between 160 to 350 C and annual rainfall 50 to 55 cm. Geographically, it located on Deccan plateau. The Tahsil is confined by 180 49' 40” N to 190 21' 13” N latitudes and 740 10' 22” E to 740 38' 34”

LOCATION MAP : PARNER TAHSIL

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E. longitudes. The Total Geographical Area (TGA) of the tahsil is 1868 sq.km. which is 10.96 percent cover area of the Ahmednagar district.

As per 2001 census the population of the tarsal is 2,46,552 which is 6.10% of the district. The decadal growth rate of population is about 15.18 percent. It is lower than(19.80%) that of Ahmednagar district. The density of population is about 131 persons per sq.km. and 1.27 persons per hectare. Though it is lower, but carrying capacity of land in this tahsil has been too much lower. The topography soil and availability of water have significant effect on the population density and distribution. There are 131 inhabited revenue villages, all grouped into four zilha perished circles (zp circles). The Administrative headquarter of the tahsil is at Parner which is rural in character. It covers an area of about 53.32 sq.km and has population of 12,312. 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 2001, only 21 percent cultivated area have been irrigated. There is low possibility in development of agriculture. Its result that emigration occurred to urban areas. \

OBJECTIVES :

The main aim of this research paper is to investigate requirement of water for agriculture on the basis of density of population per 100 hectare, amount of rainfall and percentage of area under irrigation to cultivated land.

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ASSUMPTION :

Amount of rainfall assumed here that about 50 cm. for all of the 131 villages in study area due to unavailability of data regarding rainfall for each village.

DATABASE AND METHODOLOGY :

The present research paper is entirely based on secondary source of data. The required data has been collected from the District Census Handbook, Ahmednagar-2001. 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 thirty one villages in Parner tahsil. Out of them seventy five villages includes in low growth region, thirty nine in moderate and seventeen in high growth region. Further, the formula adopted for the 'Index of Irrigation Requirement' (Ir.) for agriculture in each village is as given below.

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

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.1.

TABLE NO. 1
CLASSIFICATION OF VILLAGES ACCORDING TO IRRIGATION REQUIREMENT.

Sr No.	Index of irrigation requirement (Ir.)	Total villages	Requirement of water for agriculture.
01	Less than 0.15	68	Very Low
02	0.15 - 0.30	26	Low
03	0.30 - 0.45	15	Moderate
04	0.45 - 0.60	10	High
05	More than 0.60	12	Very High

Table no. 2 clearly reveals that number of villages consisted in each growth region with level of requirement of water. It is investigated that 68 villages need very low requirement of water, 26 villages need low, 15 need moderate, 10 needs high and 12 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: Villages having 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 sixty eight 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 Tas and Gadjipur, whereas it is highest of about 0.15 for Wadner Haveli and Palwe kh. Other villages like, Majampur, Mhase kh., Patharwadi (each 0.03); Bahirobawadi, Morwadi, Pabal, Gadilgaon, Kohokadi (each 0.04);Venkute,

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TABLE NO. 2 : 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	07	05	01	02	02	17
2	22	09	06	07	05	49
3	04	04	00	01	00	09
Low	33	18	07	10	07	75
4	03	01	02	00	01	07
5	12	06	01	00	01	20
6	07	00	03	00	02	12
Moderate	22	07	06	00	04	39
7	03	01	01	00	01	06
8	05	00	00	00	00	05
9	05	00	01	00	00	06
High	13	01	02	00	01	17
Total	68	26	15	10	12	131

Source : Computed by authors.

Pimpalner, Gunore, Wadgaon Gund, Hakigatpur, and Ralegan Therpal (0.05) having very low requirement of water for agriculture.

Comparatively above, high index of requirement in this category shows in villages like Wadner Haveli and Palwe kh. with Karegaon, Chincholi, Karjule Harya, Kasare (each 0.14); Wesdare, Padali Kanhoor, Panoli, Padali Darya, Ganji Bhoyare, Astgaon, Baburdi, Dhotre kh. , Loni Mawla, Waghunde Bk., and Wadgaon Amli (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: 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 Kalamkarwadi shows as lowest 0.10 values and 0.27 as highest value found in Bhandgaon and Shahajpur. Other villages like that Palwe Bk. Sarola Advai, Alkuti (0.16.); Wasunde, Kadus, Dhotre Bk. (0.17); Padali Ale, Jadhavwadi, Kakanewadi, Padali Ranjangaon (0.18) Sultanpur, Wadgaon Savtal (0.19) Bhangadwadi, Pimpalgaon Turk, Mungashi (0.20); Hanga, Malkup (0.22); Daithane Gunjal, Raytale, (0.23); Pimpri jalsen, Parner, Tikhoh (0.25) and they shown comfortably availability of water resources. These group of villages situated undulating hilly area of some extent. 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 fifteen 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

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irrigation requirement observed in villages like Palaspur, Nandur Pathar, Siddheshwarwadi, Loni Haveli, Mhasobazap etc. Whereas, it is 0.44 have highest value of IR found in Bhalwani of this moderate category. Other villages shows IR, as follows: RalegaonSiddhi and Jategaon-0.33, Palashi-0.34, Sawargaon-0.36 Kinhi-0.37, Dhoki 0.40, Hivare Korda-0.42, Wadzire etc. included in this category in ascending order.

4. Villages having high requirement of water: Villages About ten 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 Gargundi, Kanhoor, and Punewadi and 0.66 has a highest value observed in village Garkhindi. Others are as follows: Wadule and Wadgaon Darya-0.48, Goregaon and Randhe -0.50, Kalas -0.55, Pimpalgaon Rotha-0.59 etc. shows that high requirement of water.

5. Villages having very high requirement of water : 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. It is observed in these villages that density of population ranges between 56 to 261 and proportion of irrigated area from 2.27 % to 10.65% to cultivated area. Of them, there are seven villages in which density of population is very low (56to88) but area under irrigation is too much low (2.27 %to 6.16%) and five villages shows comparatively high density (110 to 261)and low area under irrigation (2.92% to10.65%). In this category, villages show index value of IR. As follows: Karandi-1.40 Wiroli-1.32, Diksal-0.95, Katalwedhe-0.92, Waghunde-0.86, Gatewadi-0.84, Khadakwadi-0.82, Apdhup-0.80 etc. They are facing very high deficiency of water for agriculture.

CONCLUDING REMARKS:

1. Villages situated nearer to Kukadi canal irrigation, Mand ohol, Hanga, kalu and other minor rivers or odha etc. have experienced very low and low requirement of water due to availability of water.
2. Moderate requirement of water experienced in that villages which are situated either remotely from main river or on plateau or on table land.
3. 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.
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.

SUGGESTIONS FOR IMPROVEMENT IN IRRIGATION :

There is urgent need in Parner 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. Small works such as tanks, bandanas, and dug wells 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.
2. 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. Kukadi basin (Pune district) to the all over area of Parner tahsil in Ahmednagar district. Some of the villages it is only possible actually with the help of lift irrigation due to high altitude.
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.

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