RESEARCH FRONT

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A GEOGRAPHICAL ANALYSIS OF REGION WISE REQUIREMENT OF WATER RESOURCES FOR AGRICULTURE IN PHALTAN TAHSIL OF SATARA DISTRICT

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ABSTRACT

The main aim of this research paper is, to analyse, region wise relative requirement of water for agriculture at village level. Regionalization's of study area have been done on the basis of decadal population growth and density of population per square km. Thus, ultimately evolved the four circles. Further it works out that "Index of Irrigation Requirement" (Ir.). There are 128 villages included in Phaltantahsil. Out of them 43 villages having very low (Ir. <0.15) requirement of water for agriculture, whereas 29 villages shows low (Ir. 0.15 – 0.30), 11 denotes moderate (Ir. 0.30 – 0.45), 24 are high (Ir. 0.45 – 0.60) and 21 villages observed very high (Ir. 0.60 >) requirement of water for agriculture.

KEY WORDS: Index of irrigation requirement (Ir.), Drought prone area, Population, land use and rainfall.

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 Phaltan tahsil of Satara 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.

STUDY AREA

Phaltan Tahsil is selected for the study. Phaltan Tahsil covering the part of the Nira river basin is one of the economically prosperous Tahsils of Satara district in southern Maharashtra. It lies between $17^0 58'$ north to $18^0 5'$ North latitude and $74^0 20'$ east to $74^0 40'$ East longitude. It has total geographical area of 1190.29sq.km.with128 villages and one urban settlement. (2011 census) This area is bounded by the Nira River in the north side. The region attains 576 metres height (M.S.L.) with northward slopping land drained mainly by the Banganga River, a right bank tributary of the Nira River.

PhaltanTahsil lies in the east of Satara district. It is surrounded by Baramati Tahsil in the north side, in the southeast side lies Man Tahsil, inthesouthern side lies KhatavTahsil, in the southwest side lies Koregaon Tahsil and in the western side lies Khandala Tahsil and Solapur district belongs to the east.The soil fertility encourages growth of various crops like sugarcane, jowar, bajara, maize, vegetables. According to 2011 Census the area has 342667

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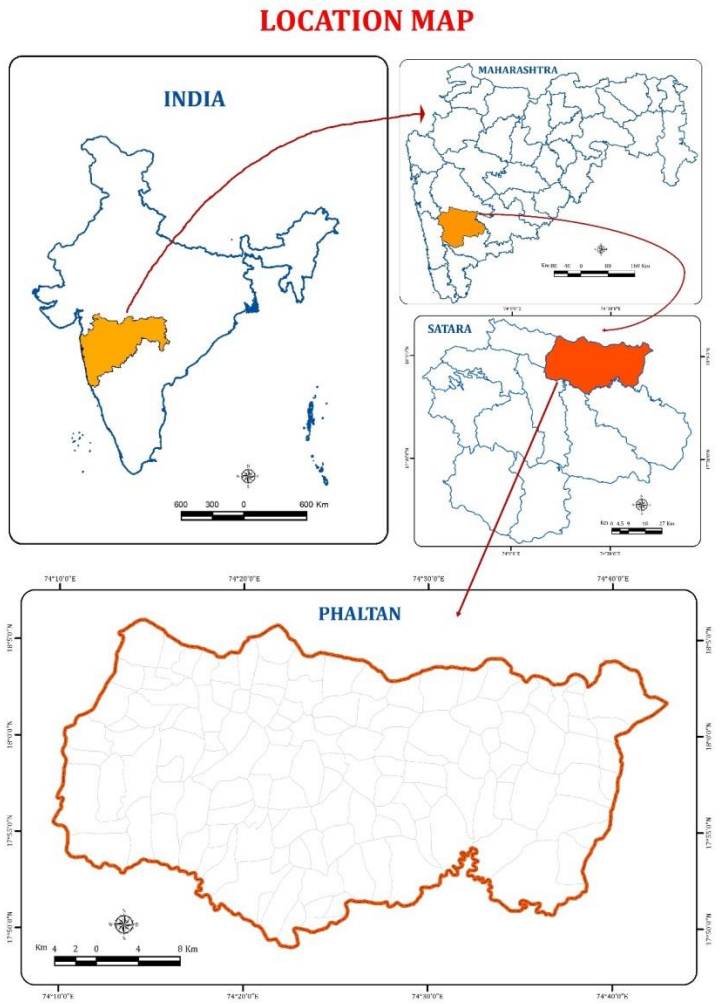
populations, out of these 176250 are males and 166417 are females and density of population is 287 per square kilometre. State highway, major district and other roads are major routs of transport besides broad-gauge railway route in Phaltan Tahsil. Phaltan is an administrative head quarter of this Tahsil (Fig.-1).

Figure-1: Location of PhaltanTahsil



OBJECTIVES:

1. To investigate requirement of water for agriculture on the basis of density of population per 100 hectares.

2.Amount of rainfall and percentage of area under irrigation to cultivated land.

ASSUMPTION

Amount of rainfall assumed here that about 50 cm. for all of the 128 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, Satara-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

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population and density per sq. km. Thus the study area identified as low (DG. percent) 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 four circles. There are one hundred twenty eighth villages in Phaltan tahsil. Out of them seventy two villages includes in low growth region, eleven in moderate and forty five 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 = Density of population per 100 hectares to TGAof that village Annual Rainfall X Irrigation intensity or percent 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-1.

Table-1

Classification ofVillages According to Irrigation Requirement.

Sr. No.	Index of irrigation requirement (Ir)	Total villages	Requirement of water for agriculture
1	Less than 0.15	**43**	Very Low
2	0.15 - 0.30	**29**	Low
3	0.30 - 0.45	**11**	Moderate
4	0.45 - 0.60	**24**	High
5	More than 0.60	**21**	Very High

Source: Computed by Researcher.

Table-2 clearly reveals that number of villages consisted in each growth region with level of requirement of water. It is investigated that 43 villages need very low requirement of water, 29 villages need low, 11 need moderate, 24 needs high and 21 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 forty three villages need very low requirement of water. Out of them twenty (46.51percent) villages having low density ranges between 10 to 175 per hundred hectares to TGA and proportion of irrigated area ranges between 2.25percent to 25.76 percent to cultivated area. Whereas, there are thirty four (50percent) villages having high proportion of irrigated area ranges between 30.24 percentto 96.37 percent 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 Waghoshi and Vadgaon, whereas it is highest of about 0.15 for Korhale and Wakhari. Other villages like, Wathar-nim, Pirachiwadi, Sherewadi, Kharadevadi, Ghadgemala (each0.03). Saskal, Dhumalwadi, Bhadalibk, Kashidvadi, Vadjal, Dalvadi,Upalave, Sawantvadi, Daryachivadi, Jadhavnagar, Malvadi and Khadaki (each 0.04).

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Table 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	04	08	01	10	07	30
2	05	05	02	06	05	23
3	03	05	03	03	03	17
Low	**12**	**18**	**06**	**19**	**15**	**70**
4	03	02	02	01	02	10
5	05	03	00	03	02	13
6	06	03	02	00	01	12
Moderate	**14**	**08**	**04**	**04**	**05**	**35**
7	12	01	01	01	01	16
8	03	00	00	00	00	03
9	02	02	00	00	00	04
High	**17**	**03**	**01**	**01**	**01**	**23**
Total	**43**	**29**	**11**	**24**	**21**	**128**

Source: Computed by Researcher.

Mirgaon, Tathvada, Manevadi, Zadakwadi, Veloshi, Tardaf, Miryachiwadi, Bhavaninagar, Thakurki, TawadiGirvi, Bodakewadi,Kurawali-kh and Mandavkhadak(0.05) having very low requirement of water for agriculture. Comparatively above, high index of requirement in this category shows in villages like Nirgudi, Vinchurni, Jadhavwadi, Zirapwadi (each 0.14), Dudhebavi, Tirakwadi, Bhadali-kh,Sonawadi-kh(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 250 and area under irrigation between 4.15percent to 25.50percent. Ranges between 0.10 to 0.27 indexes value of irrigation is observed in this category. Village Tadavale, Vitthalvadi shows as lowest 0.10 values and 0.27 as highest value found in Taradgaon, Rawadi-kh, Rawdi-bkand Dombalwadi. Other villages like that Kapasi, Alajapur, Ghadagevadi, Mulikwadi, Bibi and Kusur(0.16.);Malevadi, Shindemal, Saswad, Takubaichiwadi.(0.17); Kalaj, Salpe, Koparde, Chambharwadi, Hingangaon(0.18), Sherechiwadi, Adarki-bk, Adarki-kh(0.19), Aradgaon, Takalwade(0.20); Vadale, Mirde, (0.22); Sonawadi-bk, (0.23)) and they show 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 nine villages need low requirement of water for agriculture.

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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 irrigation requirement observed in villages like Songaon, Dhavaletc. Whereas, it is 0.44 have highest value of IR found in Dhavlevadi, Kurawali-bk of this moderate category. Other villages show IR, as follows: Dattanagar and Andhrud-0.33, Javali-0.34, Chavanwadi-0.36 Kinhi-0.37,Kapadgaon0.40, Mirewadi-0.42, Nandal etc. included in this category in ascending order.

4. Villages having high requirement of water:

Villages about twenty four 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 Surawadi, Jinti, Phartadvadi, Bhilkati,Nimbore, Hol and Sakharwadi, 0.66 has a highest value observed in village Pharadvadi, Barad and Shereshindevadi. Others are as follows: Nimbalak, Mathachivadi, Pimparad, Khunte, Shindevadi-0.48, Chaudharwadi, Kolki and Kambleshwar-0.50, Sastewadi, Vidani, Algudevadi-0.55, Sangavi, Khamgaon and Murum-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 percent to 10.65percent 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 percentto 6.16percent) and twenty one village's shows comparatively high density (110 to 261) and low area under irrigation (2.92percent to10.65percent). In this category, villages show index value of IR. As follows: Naikbomvadi, Rajale, Sathe, Sarde and Gokhali1.40 Khatkevasti, Vajegaon, Rajuri, Asu-1.32, Dhavalevadi, Shindenagar and Pawarvadi-0.95, Hanamantwadi, Jadhavwadi and Gunaware-0.92, Munjawadi, Dhuldeo, Somathali- 0.86Padegaon, Koregaon and Tambaveetc. They are facing very high deficiency of water for agriculture.

CONCLUDING REMARKS

1. Villages situated nearer to Padegaon canal irrigation, Gokhali, Khatkevasti, Rajuri and Asuand other minor rivers or canal 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.

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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 IMPROVEMENTIN IRRIGATION

There is urgent need in Phaltan 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. Nira basin (Pune and Satara district) to the all over area of Phaltan tahsil in Satara 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 give 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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