

Role Of Irrigation In Agricultural Land Practices – A Micro Level Study Of Shirpur Tehsils In Dhule District (MS).

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ABSTRACT: IN THIS PAPER AN ATTEMPT HAS BEEN MADE BY RESEARCHER TO STUDY REVENUE BLOCK WISE ANALYSIS OF ROLE OF IRRIGATION IN AGRICULTURAL PRACTICES. THEREBY TO FIND OUT IMPACT ON AGRICULTURAL LAND PRACTICES IN THE CONTEXT OF IRRIGATION FACILITIES. THE DATA ON LAND USE AND SOURCES OF IRRIGATION HAS BEEN TAKEN FOR AGRICULTURAL YEAR AS PER 2011. THE STUDY REGION FALLS UNDER ASSURED RAINFALL ZONE AND HAS RECEIVED 70 PERCENT AREA RAIN AMOUNTING 500 MM TO 1200 MM. THE AVERAGE ANNUAL RAINFALL IN STUDY AREA IS 780 MM. THE NORTHERN PART OF THE STUDY REGION RECEIVES MORE RAINFALL 800-1200 MM, WHILE SOUTH PART OF THE REGION RECEIVES LESS RAINFALL 500-700MM. BUT THE ERRATIC NATURE OF RAINFALL AFFECTS THE AGRICULTURAL PRACTICES. IN FACTS DECREASE IN RAINY DAYS, VARIATION IN INTENSITY OF RAINFALL AND COEFFICIENT OF VARIATION OF RAINFALL RANGES BETWEEN 20 TO 30 PERCENT SUGGESTS NEED OF IRRIGATION IN BOTH KHARIF AND RABI SEASONS. IN 2010-11, TOTAL 13262.15 HECTARE LAND AREA IS IRRIGATED OUT OF NET AREA SOWN (NAS) OF SHIRPUR TEHSIL. HIGHEST IRRIGATED AREA OBSERVED IN ARTHE REVENUE BLOCK THAT IS 3613.40 HECTARES AND LOWEST IN SANGAVI WITH 1004.76 HECTARES. IN THE STUDY REGION 21.55 % AREA IRRIGATED TO NET SOWN AREA OF TEHSIL IN AGRICULTURAL 2011. AS PER 2011, TOTAL POPULATION OF SHIRPUR TEHSIL IS 422137. THE PURPOSE BEHIND THE CHOICE OF THIS REGION FOR CARRIED OUT RESEARCH WORK BECAUSE OF ITS RICH AGRICULTURAL TRACK ENDOWED WITH ASSURED RAINFALL ZONE. DIVERSIFIED CROPPING PATTERN IS CULTIVATED UNDER BOTH RAIN FED AND WITH IRRIGATION FACILITIES. THE MAIN CROPS ARE GROWN SUCH AS CEREALS, PULSES, OILSEEDS, COTTON AND SUGARCANE ETC. GEOGRAPHICALLY, PRESENT STUDY AREA HAS UNIQUE FEATURES IN THE CONTEXT OF AGRICULTURAL PRACTICES; IRRIGATION FACILITIES. THE MAIN OCCUPATION OF THE PEOPLE IS AGRICULTURE IN THIS TEHSILS WITH COTTON AND SUGARCANE AS THE MAJOR PRODUCT. IT HAS THREE AGRO BASED INDUSTRIES LIKE TEXTILE, SUGAR FACTORY AND CORN MILL.

INDEX TERM : Irrigation, Revenue block, Density of Pumps, Net area sown, size of Holding.

1. INTRODUCTION –

In the context of present study the term "Irrigation" express as main factor to lead in the process of land use changes. In improving crop productivity supply of water is require at regular interval and in required quantities to soil. This could be done by artificial application of water and its termed as "Irrigation". Irrigation is the artificial application of water for increase soil moisture. Irrigation is essentially the artificial application of water to overcome deficiencies in rainfall for growing crops {Cantor, 1967}. The irrigation and its role in the development of agriculture have been studied by many geographers. Such as "Irrigation and its impact on agricultural land use in Upper Krishna basin of Maharashtra" by C. T. Pawar {1989}, In the book titled "Irrigated Agriculture", a special reference to West Bengal, India, Studied by Dr. Nandini Chatterjee {1995}, Jasbir Singh and S. S. Dhillon, in his book entitled "Agricultural Geography" studied impact of irrigation on land use change in relation to physical and nonphysical factors {1991}. Jhujar Sing (1984) has pleaded in his article entitled "Tube well irrigation and spatial organisation of agriculture" that due to inadequate, unreliable and seasonally concentrated nature of monsoon rainfall tube well play a critical role in agricultural economy

2. STUDY AREA -

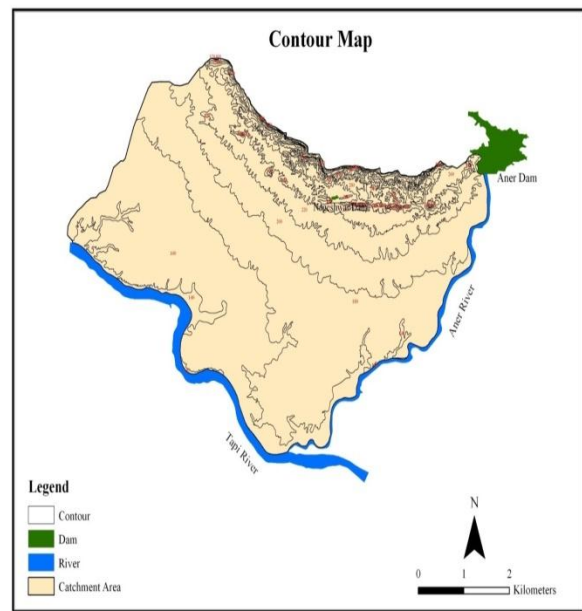
Shirpur is a city and tehsils place in Dhule district of Nasik Division of Maharashtra. It is located on Mumbai (MS) Agra (UP) National Highway (NH3). The Arunavati River flows through the city. It has located between the coordinate of 21 0 21 ' 1 " and 74 0 52 ' 43 " and situated on the Northern part of Tapi (Tapti) river and foothills of Satpura mountain. AS per 2011, total population of Shirpur tehsil is 312000. The main occupation of the people is agriculture in this tehsils with cotton and Sugarcane as the major product. It has three agro based industries like Textile, Sugar Factory and Corn Mill. The relief of this region has Satpura Mountain on the northern side and Tapi or Tapti River flows

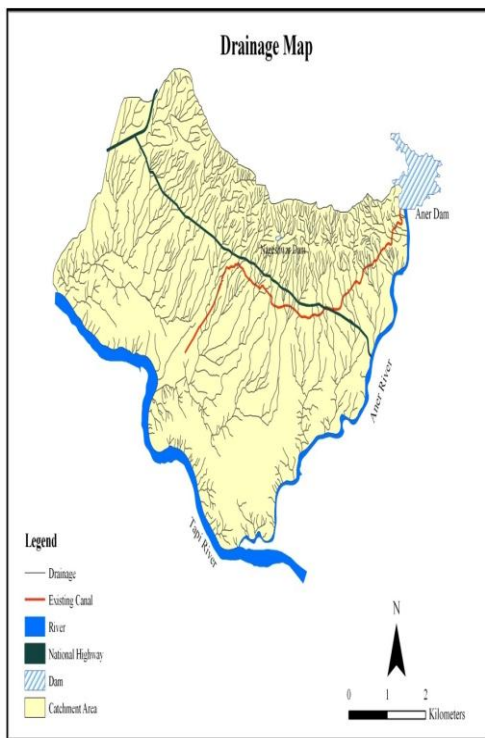
in the south, the central part of this region has rich alluvial plain. The mountain region is very ragged ranging in height from 300 to 900 metres above the sea level.

3. DRAINAGE -

Tapi is the main river flowing through the southern part and its tributaries in north side of its. The Northern tributaries due to because of the proximity of the high ranges of the Satpura are relatively small in length.

Map no 1(a) Contour and (b) Drainage Map of Study Area





Risings from innumerable springs they have been put to use for irrigation, their peculiarity is that they are near the hills and again for several kilometer's before they fall into the Tapi Their streams flows throughout the year but in the middle belt where the course piedmont debris-slopes attain their maximum depth, their waters sink below, leaving the bed perfectly dry in the summer season. These streams are Aner, Dharamkhuli, Dahivad, Arunavati, kordi, lendi, Kasari, Aner, Arunavati, are relatively more important for irrigation purposes.

4. OBJECTIVE

The objectives of the present study are to analyses are as follows [1] to prepare a map of study area for interpretation of data and slop and contour map. [2]to analyse the revenue blocks wise Gross Irrigated Area, wells and Tub wells in the agricultural year 2011.[3] to calculate density of pump set and analysis of land holders wise uses of source of Irrigation 2011.

5. DATA COLLECTION AND WORK

Secondary data used for carried out research work this paper. It has been collected from a Socio-economic abstracts 2011 and District census handbook 2011. Field work – Revenue block wise survey conducted for field work and interview of farmers. In the all revenue block of the study area farmers are interviewed with those has Marginal, Small, Medium and Large size of agricultural land. Laboratory work is carried out for calculation of data. For comparative analysis Pearson's correlation coefficient and cartographic technique has been used. The map of study area has been scanned and then digitized manually by using GIS software's and analysis has been done with the help of the tables, maps, diagrams.

6. METHODOLOGY –

For the achieving result of this research paper entitled “Role of Irrigation in Agricultural land Practices – A micro level study of Shirpur Tehsils” following methods has been are used

6.1 Analysis of Revenue blocks wise Gross Irrigated Area.

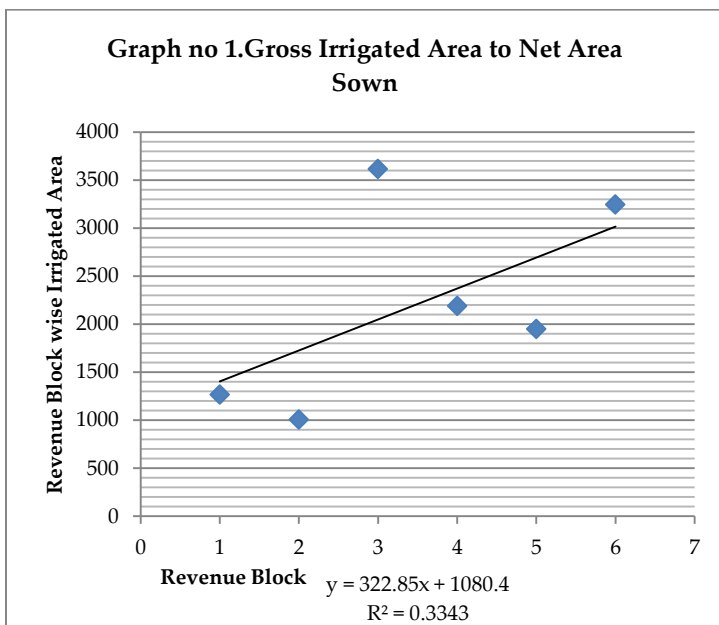
The land, which is totally cropped in Kharif and Rabbi Seasons under irrigation during current agricultural year called as Gross Irrigated Area.

Table No. 1 Distribution of Irrigated Area

Name of the Revenue Block	Revenue block Wise gross Un-irrigated Land area in Hectare	% of total Un-irrigated area to NAS of the revenue block	Revenue block Wise Gross Irrigated land area in Hectare	% of total irrigated area to NAS of the revenue block	The revenue block wise Net Area Sown in Hectare
Boradi	9104.42	87.80	1265.00	12.91	10369.42
Sangavi	11255.13	91.80	1004.76	8.19	12259.89
Arthe	8576.77	70.35	3613.40	29.64	12190.17
Shirpur	4735.00	68.40	2187.04	31.59	6922.04
Thalner	6126.96	75.88	1947.11	24.11	8074.07
Holnante	8461.30	72.28	3244.84	27.71	11706.14
Tehsil	48259.58	78.44	13262.15	21.55	61521.73

(COMPILED BY RESEARCHER)

It represents the actual physical area of agricultural land falls under by all sources of irrigation. In this study region source of irrigation is available such as Government canals, Wells, tube well .tank and lakes. In the context of source of irrigation well and tube wells are the dominated source of irrigation and very lass by tanks and lacks. Canals as a source of water is applicable for irrigation when availability of water in projects. Table no 1 indicates, In 2011 total 13262.15 hectare land area is irrigated out of net area sown (NAS) of Shirpur tehsil. Highest irrigated area observed in Arthe revenue block that is 3613.40 hectares and lowest in Sangavi with 1004.76 hectares. In the study region 21.55 % area irrigated to net sown area of tehsil in agricultural 2011.



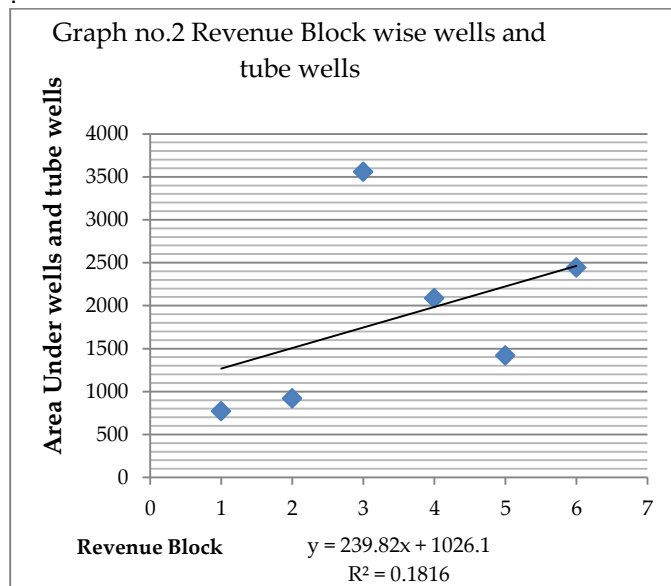
				Revenue Block			
Boradi	121.00	1.16	771.00	7.43	373.00	3.59	10369.42
Sangavi	70.21	0.57	917.64	7.48	16.91	0.13	12259.89
Arthe	0.00	0.0	3557.42	29.18	55.98	0.45	12190.17
Shirpur	102.00	0.14	2085.04	30.12	0.0	0.0	6922.04
Thalner	530.00	6.56	1417.11	17.55	0.0	0.0	8074.07
Holnanthe	800.34	6.83	2444.50	20.88	0.0	0.0	11706.14
Shirpur Tehsil	1623.55	2.63	11192.71	18.19	445.89	0.72	61521.73

(COMPILED BY RESEARCHER)

Graph no1 – Scatter Diagram ,Pearson’s correlation coefficient for Revenue block Wise gross Irrigated land to revenue block wise Net Area Sown has amounting $r = 0.197675$. It means there is no relation between the two variables. It also indicates low correlation that means pace of increase in area under irrigation is slow. In the graph Arthe and Holnanthe revenue block has above the line. And y on x is $Y = - 322.85 x + 1080.4$.

6.2 Analysis of Revenue block wise area under wells and Tub wells

Out of total irrigated area by different sources 18.19% area irrigated by wells and tube wells, 2.63 by Canals and 0.72 % by tanks and lakes to total net area sown. Canals running from Aner and Karwand medium project play important role in canal irrigation in Shirpur tehsil. Irrigated area by tank and lakes is 373 hectares in Boradi circle. In Shirpur revenue block 30.12 % area irrigated by wells and tube wells which is highest in study region and followed by Arthe with 29.18 % to total study region. There is very less area irrigated by canal with 2.63 % and 0.72 % by tanks and lakes to net area sown of study area. The highest area irrigated by canals noted in Holnanthe circle that is 800.34 hectares and in Boradi revenue block by 121 hectares.



Graph no 2 – Scatter Diagram, In graph scatter diagram clearly indicates Arthe, Shirpur and Holnanthe revenue block has above the line. And y on x is $Y = 239.82x + 1026.1$.

TABLE NO. 2, AREA IRRIGATED BY DIFFERENT SOURCES IN 2011.

Name of the Revenue Block	Canals	% of Area irrigated by canal to gross NAS of Revenue Block	Wells/ Tube Wells	% of Area Irrigated by well and tube wells to gross NAS of	Tanks/ Lakes Area	% of area irrigated by Tanks and Lake to gross NAS of Revenue Block	Net Area Sown in Hectare
Boradi	121	1.16	373	3.59	373	3.59	10369.42
Sangavi	70.21	0.57	16.91	0.13	16.91	0.13	12259.89
Arthe	0.00	0.0	55.98	0.45	55.98	0.45	12190.17
Shirpur	102.00	0.14	0.0	0.0	0.0	0.0	6922.04
Thalner	530.00	6.56	0.0	0.0	0.0	0.0	8074.07
Holnanthe	800.34	6.83	0.0	0.0	0.0	0.0	11706.14
Shirpur Tehsil	1623.55	2.63	445.89	0.72	445.89	0.72	61521.73

6.3. Analysis of Pump set.-Pumps are uses for lifting of water from well, tube well and from canal also. Data reveal in table no 3.indicates; in Shirpur tehsil has found 5495 installed pumps sets in 2011.Table No: 3 Shirpur Tehsil-Density of Pump Set 2011

Name of the Revenue Block	N S A in Hectare	Revenue block Wise gross Irrigated land area in Hectare	No. of Pump Sets	Density (Per 00’ Hectare)
Boradi	10369.42	1265.00	524	5.05

Sangavi	12259.89	1004.76	416	3.40
Arthe	12190.17	3613.40	1497	12.28
Shirpur	6922.04	2187.04	906	13.09
Thalner	8074.07	1947.11	807	9.99
Holnanthe	11706.14	3244.84	1344	11.49
Shirpur Tehsil	61521.73	13262.15	5495	8.93

(COMPILED BY RESEARCHER)

The average density of pump set per hundred hectare of net area sown is 8.93 in Shirpur tehsil in 2011. The highest number of pump sets observed in Arthe revenue block has 1497 and their density is 12.28 per 100 hectare of net area sown land. In Shirpur revenue block number of pump sets are 906 but density of pump set area high with 13.09 pumps sets per 100 hectare of net sown area. The lowest number of pump sets observed in Sangavi these are 416 with lowest density of pump sets has 3.40. The density of pump sets in Holnanthe revenue block was 11.49 and in Thalner 9.99. Pearson's correlation coefficient between revenue block Wise gross Irrigated land area and number of Pump Sets has amounting $r = 0.99$ and $df = 6(n) - 2 = 4$. In 95% critical values of the sample correlation coefficient table the critical value associated with $df = 4$ are 0.811, r is amounted 0.99 is greater than the critical value. Hence correlation is significant. It means where the increase in gross Irrigated land area and increase in number of Pump Sets as well.

6.4 Analysis of farm Size wise land Holders and Sources of Irrigation 2011.

TABLE NO 4. SIZE OF LAND HOLDING.

Farm Size	Source of Irrigation				Total
	Canals	Wells/ Tube Wells	Tanks/ Lakes Area	Canals and Wells / Tube Wells	
Marginal	11 (52.38)	7 (33.33)	3 (14.29)	0 (0.00)	21
Small	16 (8.79)	139 (76.37)	23 (12.64)	4 (2.20)	182
Medium	5 (2.92)	140 (81.87)	11 (6.43)	15 (8.77)	171
Large	1 (1.52)	47 (71.21)	2 (3.03)	16 (24.24)	66
Total	33 (7.50)	333 (75.68)	39 (8.86)	35 (7.95)	440

(COMPILED BY RESEARCHER)

Table 4 shows the farm size wise Respondents views on irrigation source. It is observed that out of the total marginal size Respondents (21) 52.38 percent make use of canal source of irrigation. Small and medium farm size farmer's have preferred mainly well and tube well for irrigation, 139

and 140 Respondents respectively out of total 440 Respondents. Large farm size farmers used wells and tube wells for irrigation followed by those 16 Respondents used jointly canals and wells/ tube wells for irrigation. Farmers in Holnanthe, Thalner and Shirpur used twins source of irrigation bore wells and canals

7. RESULTS AND CONCLUSION

The Tapi or Tapti river basin is well watered and characterized by rich alluvial formed by the streams which meet the river Aner, Arunavati, The streams are perennial and well watered is suitable for surface water. At the foot of southern face lies the alluvial piedmont plain formed by the streams flows throughout the year. However, this region is featured with abundant groundwater. Therefore, the scope of increase in irrigation facilities in terms of well and tube well. Canal irrigation is increases due to extension in command area of miner and small irrigation projects. But fluctuation was seen in area under canal irrigation because irrigation projects are not filled to their full capacity during rainy seasons. They provide irrigation facilities in winter seasons. In 2011, total 13262.15 hectare land area is irrigated out of net area sown (NAS) of Shirpur tehsil. The proportion of wells and tube wells per hundred hectares of net area sown is high in Arthe, Shirpur, Thalner and Holnanthe revenue block. Hence, in these area depleting of groundwater table very fastly. At present application of canal, wells and tube well irrigation is in practices. But it has few problems such as leakages in canals, irregular supply of electricity and depleting groundwater. To overcome these problems used proper and efficient use of irrigation by applying drip irrigation and renewed distributaries and arteries. Nowadays, farmers are applying modern methods of Irrigation such as Drip and Sprinklers.

APPENDIX –

A) NAME OF FARMER: B) REVENUE BLOCK C) NAME OF VILLAGE:
D) SOURCES OF IRRIGATION:

Sr. No.	Source of Irrigation	Total	Methods of Irrigation	Apply (Yes/No)
1	Well		Drip	
2	Tube well		Sprinklers	
3	Canal		Furrow	
4	Others		Others	

E) SIZE OF LAND HOLDING

Large (Above 5 hectares)		Medium (3-5 hectares)		Small (1-3 hectares)		Marginal (Below 1 Hectare)	
No of Holding	Area	No of Holding	Area	No Of Holding	Area	No of Holding	Area

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