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## **A GEOGRAPHICAL STUDY OF AGRICULTURAL DEVELOPMENT IN SATARA DISTRICT OF MAHARASHTRA**

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### **ABSTRACT**

Agriculture in India is subject to certain risks, which may be arising from rainfall aberration, temperature fluctuations, hailstorms, cyclones, floods and climate change. Weak rural infrastructure, market price fluctuations, and lack of credit and crop insurance are some of the other problems. These factors not only endanger the farmers' livelihood and incomes, but also undermine the viability of the agriculture sector and its potential to become a part of solution to the problem of endemic poverty of the farming community. Management and reduction of risk in agriculture is one of the key concerns of decision and policy makers. Low farm productivity is the consequence of natural calamity, farmers' illiteracy and ignorance about advanced agricultural technology and low farm investment that causes agrarian distress. It is imperative to comprehend the magnitude of fluctuations involved in agricultural output and overall agricultural development in a district like Satara in the state of Maharashtra wherein the rainfall variability and scarcity of water is a common natural risk factor that causes jeopardy of farmer's livelihood and sometimes it endangers the farmer's life, which needs to be addressed carefully and systematically. Hence, it is intended in the present paper to measure the levels of agricultural development at tahsil level in Satara district considering relevant ten indices to identify the areas lagging behind. It is found that Karad, Phaltan and Khatav tahsils are relatively developed as compared to other 8 tahsils. It is imperative to make provision of irrigation and other necessary and appropriate inputs for enhancing the agricultural productivity in the less agriculturally developed areas with which farmers' overall living condition can be improved.

**Keywords** - Net sown area, Irrigated area, Literacy, Agricultural workers

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### **Introduction**

Agricultural development is one of the most important indices for improving farmers' overall living condition in a third world country like India. Development of the agriculture primarily depends on some physical factors like topography of an area, rainfall, climate, soil, water, etc. but in present situation, with the help of capital and advanced technology, farmers try to overreach the physical factors as far as possible to enhance their agricultural production. Development of agriculture can be judged from the degree of equity in farm incomes and nature of agrarian relation (Krishna, 1992). Sharma, in 1971, suggested that agricultural development is not only assessed by the level of productivity or trend in agricultural production but also with reference to various physical inputs, viz. irrigation, use of fertilizers, HYV seeds and extent of cultivated area. Now a days, for the enhancement of agriculture commercialization other than productivity; fertilizers, seeds, net sown area, some farm implementation technologies like power operated machineries, green house, capital, ware houses, transportation, literacy etc. are also important for boosting development in agriculture.

Indian economy comprises of several important sectors, which contribute to total national product. But agriculture is the back bone of Indian economy and prosperity of agriculture can significantly contribute to the general prosperity of the nation. With a 24.2% contribution to gross

domestic product, agriculture still provides livelihood support to about two thirds of countries population, it provides to 56.7% of countries workforce. Agriculture accounts for about 14.7% of total export earnings and provides raw material to several industries (GOI, 2003).

Present research study deals with the agricultural development in Satara district in 2011. Agricultural development is assessed on the basis of literacy rate, net sown area, irrigated area, use of micro irrigation system, use of electric pump sets, ploughs, use of tractors, fertilizers, HYV seeds and agricultural workers.

### **Study Area**

Satara district is situated in the western part of Maharashtra state. This district consists of 11 tahsils, 1739 villages and 22 towns as per the census of 2011. The total geographical area of district is 10,480 sq. km extending from 17°5' to 18°11' north latitudes and 73°33' to 74°54' east longitudes. This district is bounded by border of Pune district in the north, Solapur in the east, Sangli in the south and Raigarh and Ratnagiri districts in the west. The physiography of Satara district is covered by hills and plateaus of main Sahyadri mountain with height over 1200 metres above sea level to the subdued basin of Nira river having average height of 600 metres above sea level. The western parts of the district is known for high rainfall region especially in Mahabaleshwar have over 6000 mm annual rainfall while eastern part of the district including Man, Khatav and Phaltan tahsils is drought-prone area having average annual rainfall about 500 mm.

The western part of the district is having good rainfall of above 500cm and in the eastern part it is very scanty. The rainfall varies from 100 cm in Satara town to 30 cm in some place in the eastern Satara (Satara District: Wikipedia.org). The problem is severe in its eastern side where the rainfall is less and causes less crop yield.

The whole of Satara district falls in the Deccan Traps area, the hills consist of traps intersected by Satara of basalt and topped with laterite, while of the different soils on the plains, the most common is the black loamy clay containing carbonate of lime. This sort of soil when irrigated is capable of yielding good crops. The total gross cultivated area in Satara district was 6,95,739 hectares (ha) and gross area under irrigation in 2011-12 was 2,16,830 hectares which constitutes 31.2 per cent only, which is almost double than what it is for the state of Maharashtra (16.96%). Satara district's Mahabaleshbar tahsil is highly irrigated (48.8%) followed by Khandala tahsil with irrigation of 40% and in Patan tahsil only 20.3 per cent. Satara, Jaoli and Patan tahsils are comparatively less irrigated (below average of 31.2%) as per the Satara district Land Record office, Annual Report (2011-12).

The 2011 census recorded 30,03,741 population in Satara district including 5,70,228 (18.99%) urban and 24,33,363 (81.01%) rural population respectively. Its total population is about equal to the nation of Albania or US state of Mississippi. It ranks 122nd out of 640 districts in the country. The literacy rate of the district was 82.87 per cent and figures of male and female are 79.49 per cent and 68.64 per cent respectively in 2011. Of the total main workers in Satara district (1184407), cultivators (5,21,786) and agricultural labourers (2,43,687) constitute nearly 65% workers in agricultural sector only and the remaining 35 per cent in non-agricultural.

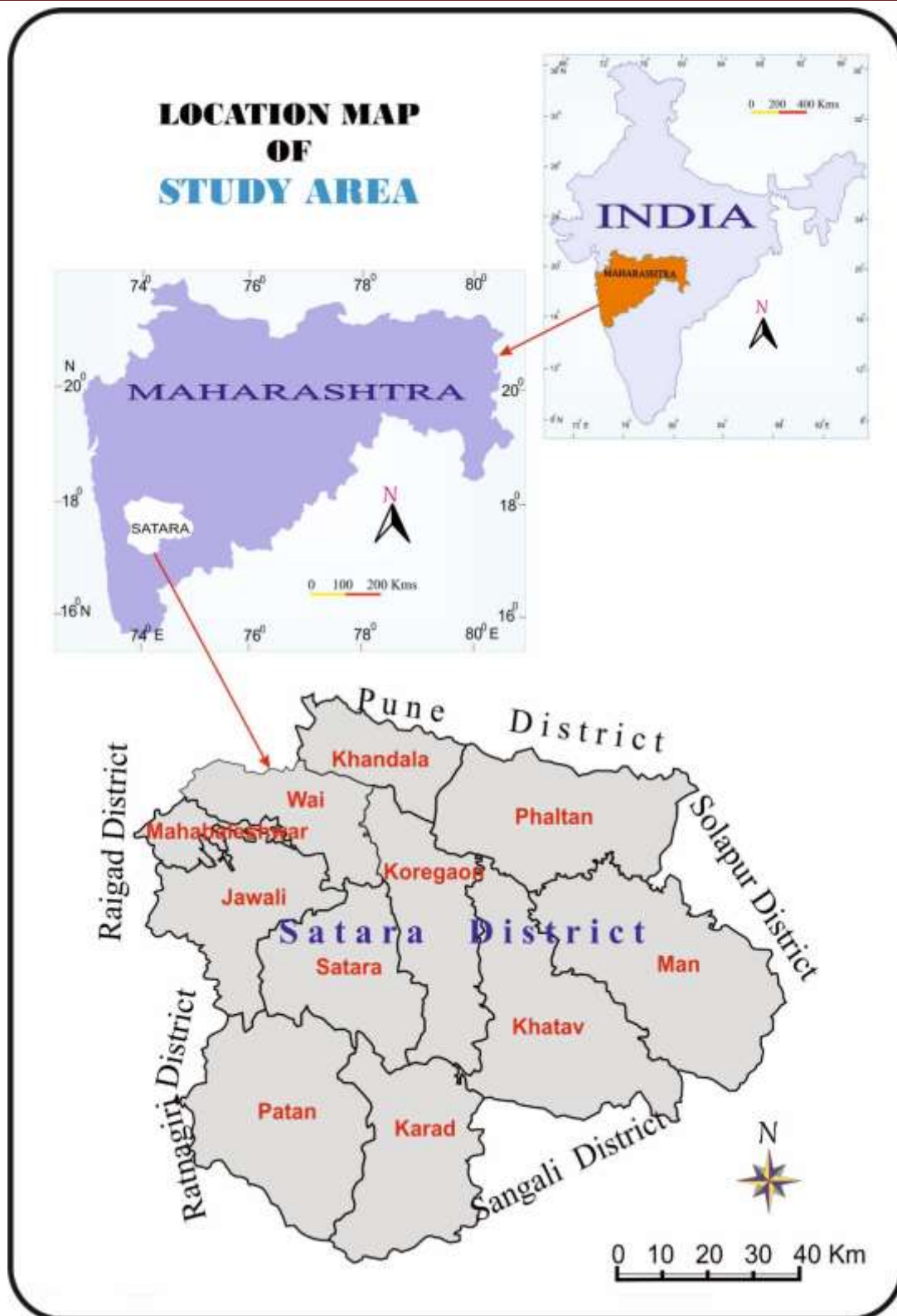


Fig. 1

### Objectives

1. To look into the factors which effect the agricultural development in Satara district.
2. To ascertain the levels and spatial variation in agricultural development.

### Data Base and Methodology

Present study is based on the secondary data, obtained from socioeconomic review of Satara district, District Census Handbook, record of Government Agricultural Department of Satara, Agriculture Department Zilha Parishad Satara. The level of agricultural development is computed by employing Edward Altman's Z - Score formula (1968), which has also been used by David Smith (1979) for measuring the inequalities in the levels of development. Altman was an assistant professor in New York University who developed this formula in September 1968 for providing an idea to investors regarding the overall financial health of company. This formula in the present study is used for measuring inequalities in the levels of agricultural development in Satara district at tahsil level as follows -

$$\text{'Z' score (Zi)} = \frac{Xi - \bar{X}}{SD}$$

Where,

Zi = Z score of i<sup>th</sup> observation

Xi = Value of i<sup>th</sup> observation

$\bar{X}$  = Mean of X variable

S.D. = Standard Deviation of X variable

Composite index is calculated for measuring agricultural development. The tahsils of the district are categorized as high, moderate and low level of agricultural development on the basis of composite index.

### Indicators Selected for the Study

For the present research study the following indicators are selected for the calculation of development of agriculture at tahsil level in Satara district.

1. Literacy Rate - Percentage of literate persons to total population in Satara district.
2. Net Sown Area - Percentage of net sown area to total agricultural area.
3. Irrigated Area - Percentage of irrigated area to total net sown area.
4. Use of Micro Irrigation System - Area under Micro Irrigation System in hectares (ha).
5. Use of Electric Pump Sets - No. of electric pump sets per 100 ha irrigated area.
6. Plough - No. of ploughs available for per 100 ha net sown area.
7. Tractors - No. of tractors available for per 1000 ha net sown area.
8. Fertilizers - Use of fertilizers in metric tons per 100 ha net sown area.
9. HYV seeds - Use of HYV seeds in per cent to total net sown area.
10. Agricultural Workers - Percentage of agricultural workers to total workers in the district.

### Agricultural Development

Agriculture in Satara district is primarily affected by physical factors viz. Sahyadri hills in western part of including Jaoli, Patan, Wai and Mahabaleshwar tahsils, some part of Satara, Karad, and Khandala tahsils are also occupied by hilly ranges of the Sahyadri. Out of the total geographical area 73.23 per cent area is occupied by hill and foot hills and only 26.77 per cent area is plain. Variation in climate is also affected on the agriculture, western part of the district comes under very high rainfall having more than 6000 mm rainfall throughout the year specially in Mahabaleshwar and some part of Wai and Jaoli tahsil, central part including Satara, Karad, Kahandala, Koregaon tahsils have 1000 to 2000 mm rainfall and eastern and north eastern part of the district including Phaltan, Man, Khatav, some part of Khandala and Koregaon have below 500 mm rainfall during the year. So that variation in the development of agriculture is observed in the district. As per the 2011, there is wide variation observed in selected indicators in Satara district. Figure 2 depicts the distribution of agricultural development in Satara district.

**Table 1**  
**SATARA DISTRICT**  
**LEVEL OF AGRICULTURAL DEVELOPMENT - 2011**

S r. N o.	Tahsil	Literacy		Net Sown Area		Irrigated Area		MIS		Electric Pump sets		Plough		Tractors		Fertilizer		HYV		Agri. workers		Total
		in %	Index	Area	Index	in %	Index	Area	Index	No.	Index	No.	Index	No.	Index	In	Index	in %	Index	in %	Index	
1	Jaoli	79.6	1.47	46.5	-0.58	29.5	-0.12	29.1	-0.80	18.7	-0.02	13.0	0.05	4	-0.88	16.2	-1.31	84.3	-0.01	72.0	0.35	-1.84
2	Karad	76.2	0.63	64.8	0.76	44.6	-0.01	591.	0.50	73.5	0.11	9.73	-0.11	35	2.90	86.9	2.45	86.6	0.10	58.3	-0.93	6.41
3	Khandala	76.0	0.59	65.4	0.81	48.1	0.09	53.0	-0.74	51.2	-0.02	2.93	-0.17	9	-0.29	34.4	-0.34	84.0	-0.02	67.0	-0.12	-0.21
4	Khatav	76.5	0.69	61.0	0.49	32.7	-0.05	1453	2.49	70.6	-0.02	6.17	-0.09	7	-0.53	28.0	-0.68	81.7	-0.13	76.5	0.76	2.94
5	Koregaon	72.3	-0.33	63.8	0.69	35.1	-0.06	630.	0.59	80.7	0.00	6.03	-0.06	12	0.12	33.0	-0.41	79.6	-0.24	74.3	0.56	0.87
6	Mahabaleshwar	64.0	-2.36	19.1	-2.59	70.8	0.09	17.8	-0.83	52.9	-0.03	17.5	0.58	5	-0.76	52.8	0.64	92.8	0.40	63.0	-0.49	-5.34
7	Man	72.1	-0.38	46.0	-0.61	35.9	-0.09	286.	-0.20	67.4	-0.03	8.09	-0.16	6	-0.62	27.2	-0.72	81.6	-0.14	83.3	1.40	-1.55
8	Patan	75.5	0.46	44.7	-0.71	31.3	-0.08	23.1	-0.81	11.9	-0.03	18.2	0.20	6	-0.54	30.9	-0.53	84.8	0.02	78.9	0.99	-1.05
9	Phaltan	68.8	-1.17	62.8	0.62	35.6	0.15	783.	0.94	78.4	0.08	5.90	-0.16	12	0.14	61.9	1.13	84.9	0.02	69.4	0.10	1.86
10	Satara	73.3	-0.08	65.0	0.78	47.7	-0.07	209.	-0.38	46.7	-0.03	12.2	-0.03	12	0.11	36.5	-0.22	84.7	0.01	42.2	-2.43	-2.34
11	Wai	75.4	0.44	59.0	0.34	47.2	-0.01	45.9	-0.76	50.9	-0.02	13.1	-0.05	14	0.35	40.6	-0.01	84.2	-0.01	66.3	-0.19	0.08
	Satara District	74.1		54.4		38.2		4123		58.5		9		12		41.1		84.5		66.2		

Source: Socio-economic Review of Satara District, 2011; Government Agricultural Department of Satara, 2011 and Agriculture Department, Zilha Parishad, Satara, 2011.

As per the calculation of composite index, it has been observed that some tahsils are more development in agricultural and some are lagging much behind. As per the data in 2011, only Karad tahsil is highly developed in agriculture with 6.41 composite index value. Because this tahsil have 50.61 per cent plain area, which is highest in the district, moderate rainfall ranging between 1000 and 2000 mm in a year and having fertile deep and alluvial soil. This tahsil also shows better position in literacy rate (75.54%) wherein it ranks fifth, third rank in net sown area (64.52%),

good and permanent irrigation facility from the Krishna and the Koyna rivers, which irrigate 44.60 per cent area of total net sown area. Due to these favourable geographical condition farmers are able to grow more crops and have high productivity to improve their economic condition. That's why they are able to use more electric pump sets, tractors (35 per 1000 ha of net sown area), high use of fertilizers (86.91 metric tons per 100 ha of net sown area), better use of HYV seeds (86.60 per cent to total net sown area).

Tahsils namely Khatav, Koregaon, Phaltan, and Wai are having moderate agricultural development. Because, of some unfavourable condition like physiography, climate, net sown area, irrigation facility, moderate use of tractors, fertilizers, HYV seeds, etc. In these tahsils, literacy rate is found above 70 per cent but most of the area is occupied by hills and foot hills having above 55 per cent, rainfall ranges between 1000 and 500 cm barring Wai. Area under irrigation in these tahsils is observed below 35 per cent to total net sown area. Availability of tractors is also low (7 to 14 per 1000 ha of net sown area), use of fertilizers is below 50 metric ton per 100 ha of net sown area and area under HYV seeds is also low. That's why moderate development of agriculture is observed in these tahsils (see table 1).



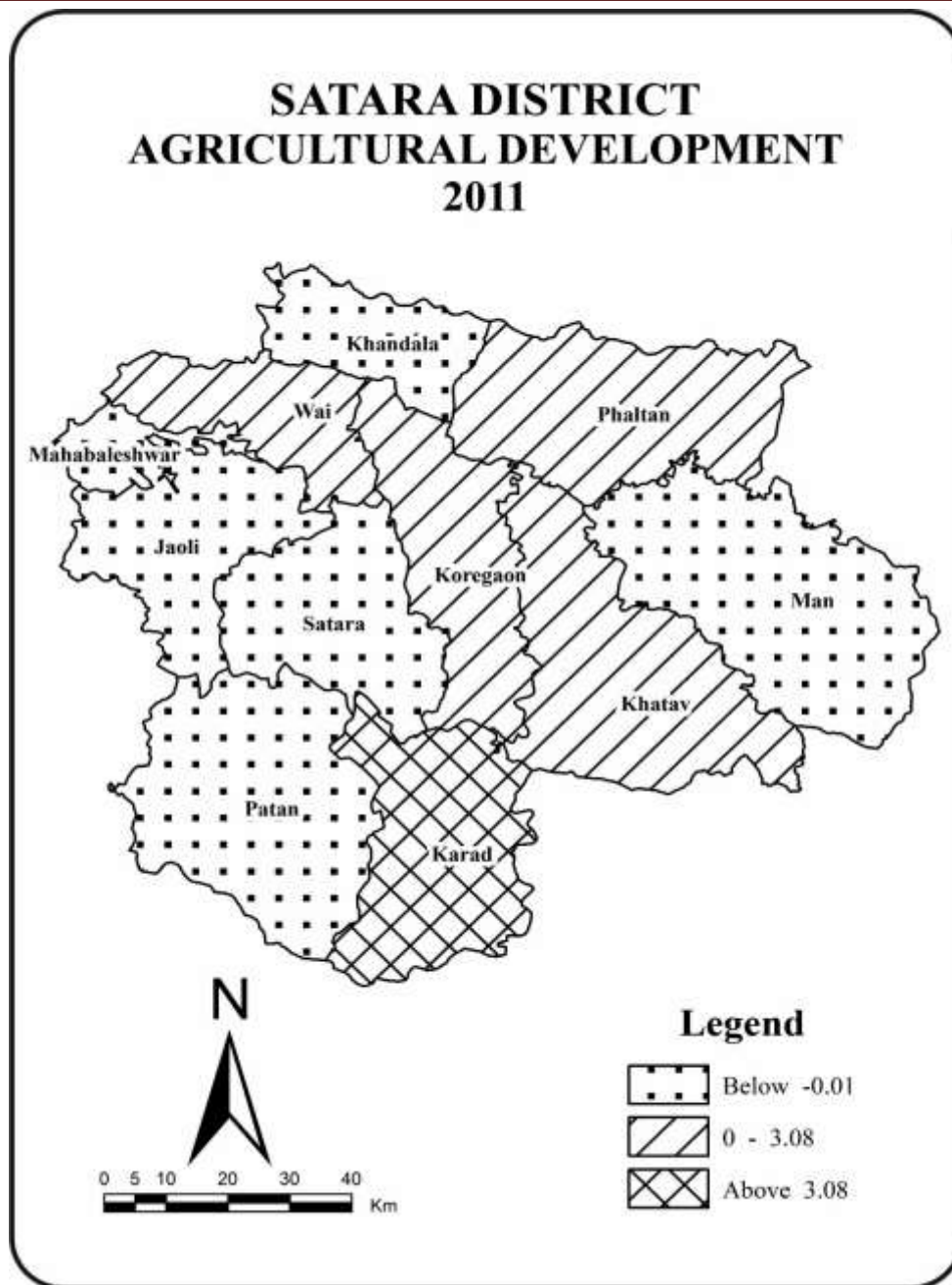


Fig. 2

Remaining six tahsils including Mahabaleshwar, Jaoli, Patan, Satara, Khandala and Man tahsils have low agricultural development. These tahsils area affected by unfavourable climatic condition and physiography. In these tahsils, Mahabaleshwar is entirely (100%) hilly, Jaoli - above 90 per cent, Patan above 87 per cent, Khandala with above 65 per cent, Satara tahsil - 75 per cent and Man -above 65 per cent hilly area including foot hills. Tahsils in western region have high to moderate rainfall of more than 2000 mm, on the other hand Man tahsil in eastern region having below 500 mm rainfall during the year. Mahabaleshwar, Jaoli and Patan tahsil have acquired relatively better literacy but due to the unfavourable geographical condition and lesser use of modern techniques. Due to small size of farm most of the work in agriculture is done by plough and with the help of man power, so availability of tractors is very low (Jaoli - 4, Mahabaleshwar - 5, Patan - 6). In Satara tahsil literacy is recorded very high (79.69%) but being the district headquarters, most of the its land is used for the construction of industries, roads, buildings, etc.,

most of the people are engaged in occupation other than agriculture, that's why this tahsil have shown low level of agricultural development. Man tahsil's one-third area plain (33.67%), but due to the low of rainfall agriculture is generally affected by the drought and scarcity of water. There is no permanent water source for irrigation, hence the proportion of irrigated area is very low (35.99%). farmers try their best to use the micro irrigation system for optimum use of water, the use of fertilizers is hardly 27.20 metric ton per 100 ha of net sown area, HYV seeds, tractors and new technologies' use is comparatively low, hence the production and income generated is also very low (see Table 1).

### Conclusion

It is hereby concluded that Karad tahsil is the most developed tahsil in agriculture and Mahabaleshwar is the most lagging behind. Tahsils with plain area, availability of water sources and good fertile soil have developed in agriculture. Satara tahsil being district headquarters, number of education institutes and industries are established here, so high literacy rate is noticed in this tahsil but most of the population is engaged in other than agriculture i.e. secondary and quaternary sectors of economy. That's why this tahsil have low level of agricultural development but in terms development in non-agriculture has been doing better. In Man tahsil due to the scarcity of water is identified with low level of agricultural development. It is felt that there is a need to make provision of permanent sources of irrigation and necessary capital and other required inputs for farming to the farmers to enhance their agricultural production. Mahabaleshwar tahsil is mostly a well developed tourism industry and in this context it is developed. But most of its land is used for food processing industry, hence in terms of agriculture this tahsil has shown less development in agriculture.

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