

**SPATIO-TEMPORAL CHANGES IN AGRICULTURAL RESOURCE
DEVELOPMENT OF SATARA DISTRICT (2001-2016)**

Dr. Sudhakar Koli, Assistant Professor, Dept. of Geography, Chhatrapati Shivaji College,
Satara (A Constituent College of Karmaveer Bhaurao Patil University, Satara)

Dr. Abhijit Phate, Assistant Professor, Dept. of Geography, Savitribai Phule Mahila
Mahavidyalaya, Satara

Dr. Basavaraj Mali, Assistant Professor, Dept. of Geography, Lal Bahadur Shastri College
of Art, Science and Commerce, Satara

Abstract:-

Agriculture is the most important activity in India. Near about 75% population of India engaged in agriculture field. Agriculture is a backbone of Indian economy. Agricultural resources play a significant role in the exploitation of basics resources and conservation at any stage. Agricultural resource development is considered as a basics factor in the processes of national development. Karad Tahsil has first rank in Agricultural resource development, because development of Irrigation, Agro based industries, infrastructural facilities, Fertilizers, are largest proportion as compared to other tahsil. Lowest Agriculture resource development is found in Mahableshwar, Jaoli, Khandala and Man tahsil because these are high rain fall, and other physiographic conditions.No doubt that the agricultural resources effects on the agricultural development.

Keywords: Agricultural resources, Irrigation, agriculture, level of agriculture development

Introduction

Agriculture comes from the Latin words "ager," which means "land" or "field," and "cultura," which means "cultivation." It refers to both the science and the art of raising animals and crops. Raising plants from the soil for human use is an art form. The most significant activity in India is agriculture. In India, around 75% of the population works in agriculture. The Indian economy is based primarily on agriculture.

Agriculture geography studies the variation in agricultural activity. Because of factors including relief, geography, climate, soil type, and irrigation availability, agricultural activity varies greatly across different regions. Therefore, differences in agricultural activities are also included in the study of agriculture geography. When examining this variance, one attempts to pinpoint the precise causes of this variation.

Agriculture geographer thought that agricultural development is linked with agricultural resources.In the current study, an attempt has been made to analyze the variation in the development of agricultural resources in Satara district at the tahsil level. This is because agricultural resources vary from one region to another due to differences in nature and agricultural characteristics in space and time, which indicates balance in an area's overall development.Attemptswere made to classify a region into high, medium, and low agricultural resource development.

Objectives

1. To examine the Spatio-temporal changes in agricultural resources development in the Satara district.
2. To demarcate the agricultural resources development region.

Data Base & Methodology

The present study is based on secondary data. For this study, tehsil wise data has been collected. This data collected from various sources such as Agriculture department of the district, Socio-economic abstract of Satara district, District statistical handbook etc.

Methodology for Levels of Agricultural Resource Development

For calculation overall levels of agricultural resource development and it's even, distribution the data of all variables indicators have been transformed into Z-score techniques. The formula is

$$Z\text{-score } (Z_i) = \frac{X_i - \bar{X}}{S.D.}$$

Where,

Z_i = Z-score for 'I' observation

X_i = Original Value of i^{th} observation

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

S.D. = Standard Deviation of 'X' variable

In order to classify tehsils according to their agricultural resource development, the composite Z-score have been grouped into high, medium and low.

The final result of Z-score obtained for different indicators was aggregated by Composite Standard Score (CSS) to bring development on a common scale. The composite standard score expressed as follows.

$$CSS = \frac{\sum Z_{ij}}{N}$$

Where,

CSS = Composite Standard Score

Z_{ij} = Score of an indicator 'j' in tehsil 'i'

N = Total number of Indicators

In order to classify the tehsil according to the development, the composite scores were divided into three classes i.e. high, medium and low.

List of selected indicators/variables

The list of indicators/variables used for the analysis the agricultural development in sample villages in Satara district is as follows.

1. Percentage of net sown area to total geographical area (Xi)
2. Percentage of net irrigated area to net sown area (Xii)
3. Percentage of agricultural worker to the total workers (Xiii)
4. Total number of tractors to gross cropped area (Xiv)
5. Total number of iron plough to the gross cropped area (Xv)
6. Total number of electric pump to the gross cropped area (Xvi)
7. Total consumption of chemical fertilizer to the gross cropped area (Xvii)
8. Total number of Primary Agriculture Credit Society (PACS) (Xviii)

Interpretation:-

Here, Researchers has examined agriculture resources in the Satara district for to do better plan of the future agricultural development. The index of Z-score indicates spatial disparities in the agricultural resources development. Western Tehsils especially Mahabaleshwar, Jaoli, Wai are Poor agricultural development due to hilly terrain, forest cover, and limited irrigation. Central & Southern tahsils i.e. Phaltan, Karad, Khatav noticed high agricultural productivity due to better irrigation, mechanization, and financial infrastructure. While Eastern & Dry tahsils specially Man, Khandala are Struggling due to water scarcity and traditional farming practices.

Table-1: Composite Z-Score of the variables for the agricultural Resource development Satara District (2001)

Sr. No.	Tehsil	Net Sown Area	Net Irrigated area	Agricultural Worker	Tractor	Iron Plough	Electric Pump	Use of Fertilizers	PACS	Composite Index
1	Mahabaleshwar	-2.29	1.72	-2.31	-1.48	-1.23	-0.81	-1.18	-1.9	-1.19
2	Wai	0.14	-1.34	0.12	0.33	0.15	-0.6	-0.45	-0.58	-0.28
3	Khandala	0.41	0.57	-0.73	-0.63	-1.09	-0.62	-0.6	-0.78	-0.43
4	Phaltan	-0.13	1.8	0.48	-0.1	-0.57	2.03	1.3	0.95	0.72
5	Man	-0.68	-0.7	1.15	-0.97	-0.62	0.13	-0.31	-0.36	-0.30
6	Khatav	0.97	-0.24	0.79	0.03	2.08	1.7	0.13	0.38	0.73
7	Koregaon	0.73	-0.23	0.48	0.49	0.79	0.15	-0.01	0.11	0.31
8	Satara	0.63	-0.41	-0.9	0.58	0.92	-0.65	-0.16	1.37	0.17
9	Jaoli	-0.14	-0.9	0.45	-1.2	-0.57	-0.75	-0.89	-0.83	-0.60
10	Patan	-0.86	-0.32	0.76	1.5	0.53	-0.73	-0.16	0.41	0.14

11	Karad	1.2	0.07	-0.29	1.44	-0.4	0.15	2.32	1.23	0.72
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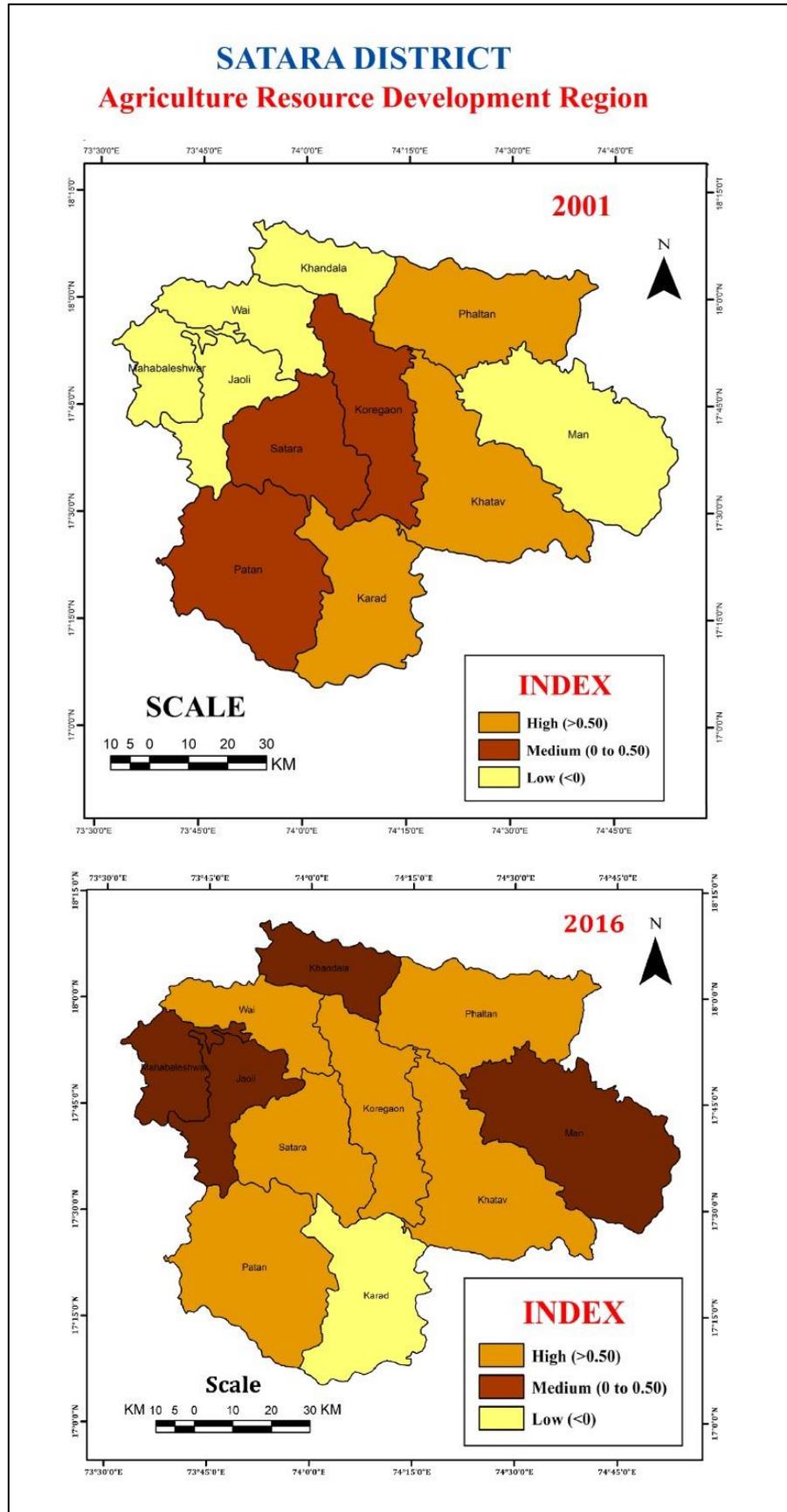
The data represents a composite index for agricultural resource development across different tehsils in Satara District. The lowest composite index (-1.00) recorded in Mahabaleshwar tahsil which suggesting relatively lower agricultural development compared to others. Due to its mountainous terrain, limit arable land and irrigation potential. Karad Tahsil has the highest composite index (1.21), indicates strong agricultural development. be due to factors like favorable topography, better access to irrigation, There's a clear spatial variation in agricultural development across the tehsils. Tehsils in the central and southern parts (e.g., Karad, Patan) tend to have higher indices, while those in the northern and western regions (e.g., Mahabaleshwar, Khandala) have lower indices.

Table-2: Composite Z-Score of the variables fortheagriculturalResource developmentSatara District (2016)

Sr. No.	Tehsil	Net Sown Area	Net Irrigated area	Agricultural Worker	Tractor	Iron Plough	Electric Pump	Use of Fertilizers	PACS	Composite Index
1	Mahabaleshwar	-1.08	1.54	-1.48	-0.94	-1.77	-1.29	-1.18	-1.81	-1.00
2	Wai	0.33	0.82	-0.06	-0.19	-0.22	0.51	-0.45	-0.64	0.01
3	Khandala	-0.76	0.74	-0.21	-0.49	-1.52	-0.98	-0.59	-0.83	-0.58
4	Phaltan	-0.49	0.41	0.33	0.37	0.31	0.74	1.30	0.98	0.49
5	Man	-1.05	-0.98	1.20	-0.42	0.39	0.12	-0.37	-0.33	-0.18
6	Khatav	1.28	-2.02	0.90	-0.07	1.04	0.94	0.13	0.39	0.32
7	Koregaon	0.41	-0.20	0.35	-0.13	-0.16	0.41	-0.01	0.10	0.10
8	Satara	0.49	0.04	-1.93	0.07	0.71	-0.06	-0.10	1.39	0.08
9	Jaoli	-0.70	0.69	0.47	-0.70	-0.77	-1.15	-0.90	-0.88	-0.49
10	Patan	-0.45	-0.26	1.00	-0.32	1.12	-1.02	-0.16	0.41	0.04
11	Karad	2.02	-0.79	-0.59	2.81	0.88	1.77	2.32	1.22	1.21

This suggests that geographical factors like topography, soil type, and access to water resources play a significant role. Decreasing trend of high developed region noticed.

No.



Map
 1 :
 Satara
 District-

Agriculture Resource Development Region

The reason might be less focus on agriculture development activities, degrading resources like soil erosion water scarcity changing land use cover, lack of investment in agricultural sector.

Table-3: Agriculture Resource Development Region

2001				2016	
Development	Index value	No. of Tahsil	Name of Tahsil	No. of Tahsil	Name of Tahsil
High	> 0.50	03	Karad, Phaltan, Khatav	01	Karad
Medium	0 to 0.50	03	Koregaon, Satara, Patan	06	Wai, Phaltan, Khatav, Koregaon Satara, Patan
Low	< 0	05	Mahabaleshwar, Khandala, Man, Jaoli, Wai	04	Mahabaleshwar, Khandala, Man, Jaoli

Increasing trend of medium developed region is noticed. Some areas previously categorized as "Low" or "High" might have experienced moderate improvement and slightly decreasing trend of low developed region is noticed.

Conclusion:

The study on agricultural resource development in Satara District (2001-2016) highlights significant Spatio-temporal variations across different tehsils. The findings indicate that Karad consistently ranks highest in agricultural development due to its favorable topography, irrigation facilities, and infrastructure, while Mahabaleshwar and Jaoli remain the least developed due to hilly terrain, dense forest cover, and limited irrigation. Over time, there has been a decline in highly developed agricultural regions, while medium-developed areas have increased, suggesting moderate improvements in resource management. The study emphasizes the need for strategic interventions to address disparities and enhance sustainable agricultural growth.

Expansion and modernization of irrigation infrastructure in low-performing tehsils like Mahabaleshwar and Khandala to ensure better water availability. Implement soil conservation techniques and water management strategies to prevent soil erosion and mitigate water scarcity in areas like Man and Khandala. Strengthen cooperative societies, agricultural credit facilities, and financial institutions to support farmers in accessing modern farming techniques. Encourage farmers to adopt crop diversification to reduce dependency on single crops and improve agricultural resilience against climatic fluctuations

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