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Address for correspondence:
Dr. Pravin Deepak Sonawane
Assistant Professor, Department of Geography, M.G.Vs Loknete Vyankatrao Hiray Arts, Science and commerce (Autonomous) College, Panchavati, Nashik, Maharashtra, India
Email: pravindsonawane27@gmail.com

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Intra-District Spatial Differentiation in the Socio-Economic Conditions of the Katkari Tribe: A Study of Nashik District, Maharashtra

Dr. Pravin Deepak Sonawane
Assistant Professor, Department of Geography, M.G.Vs Loknete Vyankatrao Hiray Arts, Science and commerce (Autonomous) College, Panchavati, Nashik, Maharashtra, India

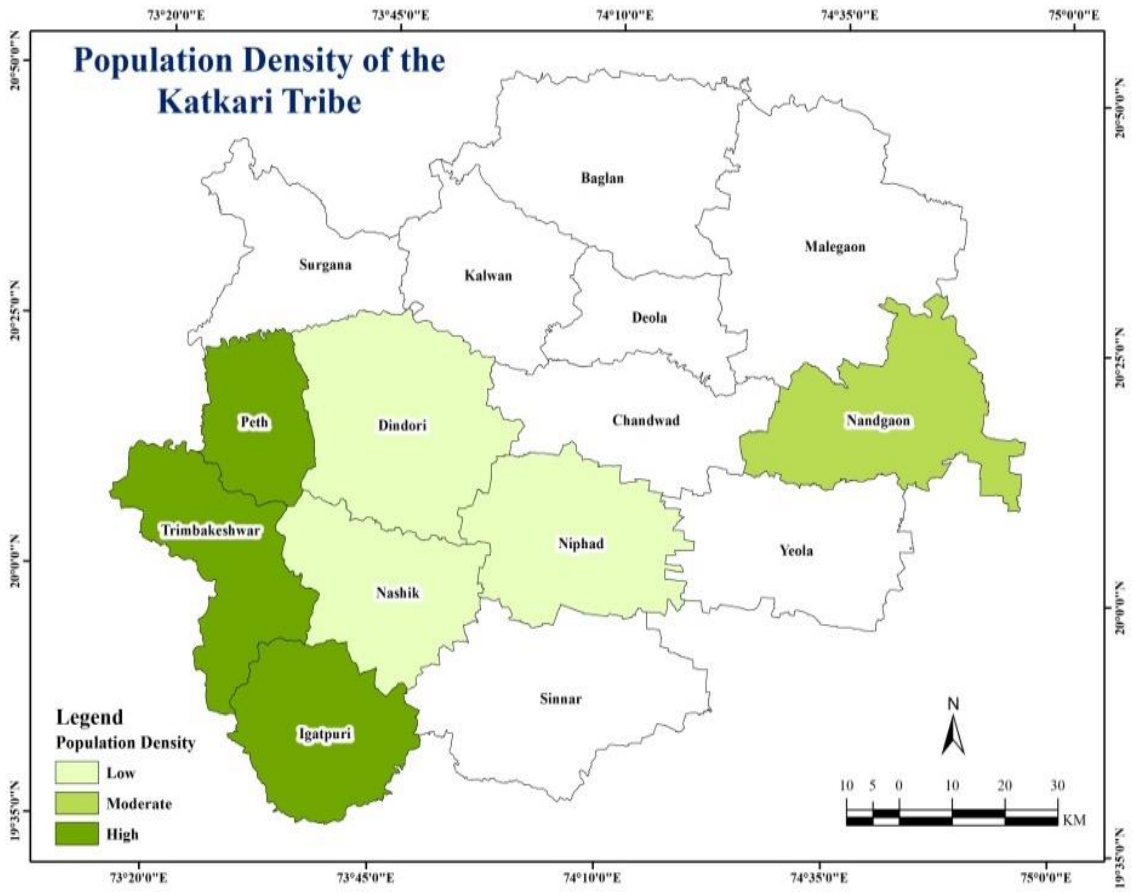
Abstract

The socio-economic conditions of Particularly Vulnerable Tribal Groups (PVTGs) are often characterised by substantial geographical inequalities, yet intra-district variations within tribal communities remain insufficiently examined. This study analyses the intra-district spatial differentiation in the socio-economic conditions of the Katkari tribe in Nashik District, Maharashtra, with particular emphasis on literacy, occupational structure, household income, seasonal migration, housing conditions, sanitation, and access to basic services. The study is based primarily on field data collected from 575 Katkari households across seven tehsils of Nashik District: Igatpuri, Trimbakeshwar, Peth, Nandgaon, Niphad, Nashik, and Dindori. The findings were contextualized with secondary data from Census records, Tribal Research and Training Institute reports, Adivasi Vikas Bhavan and other relevant sources. The study points to a tremendous spatial variation in socio-economic conditions. Nandgaon is found to be a comparatively better area with highest average monthly household income (₹9,500), highest literacy rate (57.76%) and lowest migration rate (13.02%). Conversely, Igatpuri, Trimbakeshwar and Peth exhibit a greater dependence on wage labor and seasonal migration, whereas Dindori records relatively low income and particularly poor sanitation conditions. Correlation analysis shows a strong positive correlation between brick-kiln labor and migration ($r = +0.81$), a positive correlation between income and own farming ($r = +0.63$) and a negative correlation between income and migration ($r = -0.56$). The findings demonstrate that land access, livelihood opportunities, occupational structure, income and local accessibility contribute to intra-district socio-economic differentiation. The study recommends geographically targeted and tehsil-specific development interventions, instead of a uniform approach for Katkari development.

Keywords: *Katkari Tribe, Spatial Differentiation, Socio-Economic Conditions, PVTG, Nashik District, Migration, Livelihoods*

Introduction

Socio-economic conditions among tribal communities are shaped by a complex interaction of geographical, economic, social, and institutional factors. Within a tribal population, these conditions are rarely uniform across space. Differences in access to land, employment opportunities, natural resources, infrastructure, education, and public services can produce substantial variations in household well-being between different geographical areas. Therefore, examining socio-economic conditions from a spatial perspective is important for understanding the geographical inequalities experienced by vulnerable tribal communities.The Katkari are one of the Particularly Vulnerable Tribal Groups (PVTGs) of India and are mainly concentrated in Maharashtra. Their socio-economic conditions have been historically shaped by limited access to productive assets, dependence on informal employment, low educational attainment, migration and inadequate basic amenities. However, these features are not uniform across all Katkari settlements. The geographical context in which households are located plays an important role in shaping their livelihood opportunities and standard of living.



Source: Compiled by Author, from census 2011 and TDD Nashik & TDD Kalwan.

Nashik district provides an important geographical setting for examining such differences. Katkari settlements in the district are concentrated in seven tehsils, namely Igatpuri, Trimbakeshwar, Peth, Nandgaon, Niphad, Nashik, and Dindori. These areas differ considerably in their physical setting, accessibility, agricultural opportunities, degree of urban influence, availability of employment, and distribution of Katkari households. The study area therefore provides an opportunity to examine how socio-economic conditions vary geographically within the same tribal community. The present study focuses on the spatial differentiation of socio-economic conditions among Katkari households rather than examining occupational change as a historical process. It compares selected socio-economic indicators across the seven tehsils to identify areas of relative advantage and disadvantage. Particular attention is given to literacy, occupational structure, household income, migration, housing conditions, and access to basic facilities. The field investigation covers 575 Katkari households selected from the identified settlements, providing a basis for tehsil-level comparison. The existing field evidence indicates considerable differences among the seven tehsils. For example, Nandgaon records comparatively higher household income and lower migration, while Igatpuri, Peth, and Trimbakeshwar show greater dependence on wage labour and seasonal migration. Such differences suggest that the socio-economic position of Katkari households is closely associated with their geographical location and the opportunities available within and around their settlements. Against this background, the present study attempts to identify the geographical pattern of socio-economic conditions among the Katkari tribe in Nashik district and to examine the factors contributing to spatial differentiation. Understanding these intra-district differences is important for developing geographically targeted and tehsil-specific interventions rather than applying a uniform development strategy to all Katkari settlements.

Literature Review

1. Social Economic Vulnerability of Tribes and Spatial Heterogeneity

Studies of tribal communities in India have consistently shown that socio-economic vulnerability is shaped by the interaction of livelihood resources, geographical isolation, access to infrastructure, education, health care and participation in development programmes. The disadvantages of Particularly Vulnerable Tribal Groups (PVTGs) are particularly stark and linked to limited productive assets, limited access to services and geographical marginalisation. Reviews of PVTG conditions have emphasised that vulnerability is multidimensional and extends beyond income poverty to include education, health, livelihood security, infrastructure, and institutional access. The geographical dimension of tribal vulnerability is particularly important because tribal households living within the same district or social group may experience substantially different opportunities and constraints. Factors such as availability of natural resources, land ownership, access to markets and public institutions, employment

opportunities and differences in accessibility can influence livelihood strategies and household well-being. Therefore, spatially disaggregated analysis offers a way to identify inequalities that may be obscured in district or community-wide averages. Studies of tribal livelihood vulnerability have increasingly adopted household-level and spatial approaches. For example, research involving multiple tribal and PVTG communities in eastern India demonstrates the usefulness of livelihood vulnerability assessment for identifying differences in exposure, adaptive capacity, and livelihood conditions across communities and locations. Similarly, recent research on tribal communities in central India demonstrates that livelihood vulnerability can vary geographically and is influenced by the interaction of environmental and socio-economic factors.

2. **Livelihood Transformation among the Katkari**

The Katkari constitute one of Maharashtra's PVTGs and have historically maintained livelihood relationships with forests and forest-based resources. Earlier livelihood systems included activities associated with catechu production, forest-resource collection, hunting, fishing, and agricultural labour. Changes in forest resource access and broader socio-economic changes have led to a move towards wage and informal employment. Current literature suggests that shrinking of traditional livelihood opportunities has led to greater reliance on agricultural labour, brick-kiln work, construction and other informal employment. Historical accounts of Katkari livelihoods also note seasonal movement associated with brick-making and agricultural labour, indicating that migration has long been linked to the availability of local livelihood opportunities. Recent work continues to point to livelihood insecurity as a major concern for Katkari households. A study of migration and livelihoods among the Katkari in Maharashtra with special reference to migration emphasises the significance of landlessness, lack of local employment, low wages, water scarcity and seasonal employment in the development of migration patterns. It also points out the heavy dependence of migrant households on brick kilns, construction and agricultural labour. These findings are consistent with the broader literature indicating that the transformation of Katkari livelihoods cannot be understood solely as occupational change. It is also associated with questions of land access, economic security, migration, access to public services, and the capacity of households to maintain stable livelihoods.

3. **Education, Migration and Socio-Economic Conditions**

Education represents an important dimension of socio-economic well-being among tribal communities. Research among the Katkari highlights low literacy, non-attendance at school, drop-out, inadequate educational infrastructure and seasonal migration as interlinked problems. In Kurane's study on the educational profile of Katkaris, poor socio-economic conditions and seasonal migration were identified as important factors influencing educational participation. Migration is of particular importance since it can be both a livelihood strategy and a source of socio-economic vulnerability. Seasonal migration can provide households with access to employment and income opportunities not available locally. However, longer or repeated migration can interrupt children's education, limit their access to welfare services and undermine the continuity of development interventions at the household level . Recent Katkari research similarly identifies migration to brick kilns and other informal employment locations as a major livelihood strategy. The relationship between migration and local livelihood conditions therefore requires spatial examination. Households with access to land and stable local employment may have less need to migrate, whereas households dependent on seasonal wage labour may experience greater mobility. This relationship provides an important analytical basis for examining differences in migration between Katkari-concentrated areas within Nashik District.

4. **Land, Livelihood Security and Household Well-Being**

Access to productive assets, particularly agricultural land, is an important determinant of livelihood security. Vulnerable tribal communities: Literature points to the possibility that households with more access to productive resources may have more diversified livelihood strategies and more capacity to withstand economic shocks. Conversely, landlessness or lack of productive assets may increase dependence on casual wage employment and migration. Studies on the Katkari, in particular, indicate that low land ownership and dependence on wage labour are associated with socio-economic vulnerability. Recent studies point to the economic situation of Katkari livelihoods as being constituted by a combination of marginal land ownership, precarious employment and seasonal migration. This relationship is particularly relevant to the present study because the field findings indicate substantial differences between the seven selected tehsils. Nandgaon, where some Katkari households have access to agricultural land and participate in own farming, records comparatively higher household income and lower migration. In contrast, Igatpuri, Trimbakeshwar, and Peth show greater dependence on wage-based occupations and seasonal migration.

5. **Research on Katkari Socio-Economic Development**

Existing Katkari research has provided valuable evidence concerning education, livelihoods, migration, health, poverty, and access to development programmes. Recent literature continues to emphasise the persistence of socio-economic deprivation despite the implementation of government welfare and development interventions. Problems relating to employment, education, healthcare, housing, nutrition, and access to essential documentation and welfare benefits remain important areas of concern. However, much of the available literature focuses on the overall socio-economic condition of the Katkari community or examines particular dimensions such as education, migration, livelihood, or welfare. These studies provide an important foundation, but do not fully explain the geographical variation in socio-economic conditions within a single district.

Research Gap

The socio-economic conditions of Particularly Vulnerable Tribal Groups (PVTGs) continue to represent an important concern in the context of inclusive and geographically balanced development. The Katkari community,

recognised as a PVTG in Maharashtra, faces multiple socio-economic challenges associated with limited access to productive resources, dependence on informal employment, seasonal migration, low educational attainment, inadequate housing and sanitation, and uneven access to basic services. However, these conditions cannot necessarily be assumed to be uniform across all Katkari settlements. Differences in local livelihood opportunities, land access, employment structure, accessibility, and availability of basic services may produce substantial geographical variations within the same tribal community. A major problem in understanding Katkari socio-economic conditions is therefore the tendency to examine the community at an aggregated level. District-level or community-level averages can conceal important differences between individual settlements and administrative areas. In the case of Nashik District, Katkari households are distributed unevenly across different tehsils, with substantial concentrations in some areas and comparatively smaller settlement clusters in others. Such spatial variation provides an important basis for examining whether differences in geographical context are associated with differences in household socio-economic conditions.

Previous studies on the Katkari have examined several dimensions of their socio-economic life, including traditional and changing livelihoods, forest dependence, wage employment, education, migration, land access, poverty, and access to development programmes. These studies provide an important foundation for understanding the vulnerability of the community. However, there is comparatively limited emphasis on systematic intra-district comparison of multiple socio-economic indicators within the Katkari community. In particular, the simultaneous spatial examination of literacy, occupational structure, household income, seasonal migration, housing conditions, sanitation, and access to basic services across different Katkari-concentrated tehsils remains insufficiently explored.

The research problem addressed in the present study therefore concerns the extent and nature of intra-district spatial differentiation in the socio-economic conditions of Katkari households. The study attempts to understand whether the Katkari households are facing similar socio-economic conditions across Nashik District or if there are significant differences between the selected tehsils. It also examines whether there are variations in household income and seasonal migration by livelihood characteristics, especially land-based activities, wage employment and brick-kiln labor.

The field evidence provides a basis for investigating these questions. The selected tehsils demonstrate considerable variation in Katkari population concentration, household characteristics, occupational structure, income, and migration. For example, Nandgaon has relatively higher household income and less migration while Igatpuri, Trimbakeshwar and Peth show higher dependence on wage-based occupations and seasonal migration. Such differences indicate that the socio-economic condition of the Katkari cannot be adequately represented by a single district-level profile. The present study addresses this gap through a tehsil-level comparative analysis based on field data from 575 Katkari households across seven selected tehsils of Nashik District. It examines the spatial distribution of the community and compares selected socio-economic indicators across the study area. It also examines relationships among selected livelihood variables, including occupation, income, and migration. The study consequently shifts the analytical focus from a general description of Katkari deprivation towards a geographically differentiated assessment of socio-economic conditions. The study is therefore significant from both geographical and development perspectives. Identifying intra-district differences can help reveal areas where particular forms of deprivation are concentrated and where livelihood opportunities are relatively stronger. Such evidence can support geographically more specific measures in areas where dependence on seasonal migration, informal employment, inadequate housing, poor sanitation or limited livelihood opportunities is more pronounced.

Conceptual and Analytical Framework

The present study conceptualises the socio-economic condition of the Katkari community as **a** spatially differentiated outcome of livelihood opportunities, access to productive resources, employment patterns, income, migration, and household living conditions**.** The framework is based on the premise that Katkari households living in different geographical settings may have unequal access to land, agricultural opportunities, wage employment, markets, infrastructure, and basic services. These differences may affect the livelihood strategies pursued by households and hence their socio-economic well-being. The first level of the framework is the spatial and resource context. The composition of household livelihood decisions is based on the availability of agricultural land, local employment opportunities, accessibility, infrastructure and other livelihood resources. Unequal access to these resources can result in different occupational choices across geographical areas. The second level represents the livelihood and occupational structure. Katkari households may depend on own farming, agricultural labour, brick-kiln work, construction, forest-related activities, and other forms of wage employment. Households lacking access to productive land and stable local employment are more likely to depend on informal and seasonal wage-based activities.

The third level is the economic status of the household, which is mainly reflected by the household income. The nature and stability of livelihood activities determine the income generating capacity of households. In the present study, correlation analysis is employed to examine the relationship between income and own farming, which provides empirical basis to assess the association between land-based livelihood opportunities and household income. The fourth component is **seasonal migration**. Migration is conceptualised as both a livelihood strategy and an indicator of limited local livelihood opportunities. Households dependent on seasonal employment, particularly brick-kiln labour, may have a greater tendency to migrate in search of employment. The study thus looks at the relationship between occupational dependence, household income and seasonal migration, rather than assuming a direct causal relationship.

The final part is household living conditions, including housing, sanitation and access to basic services. These indicators provide an additional dimension for assessing socio-economic well-being. Differences in income and livelihood security may be reflected in the quality of housing and the availability of household facilities.

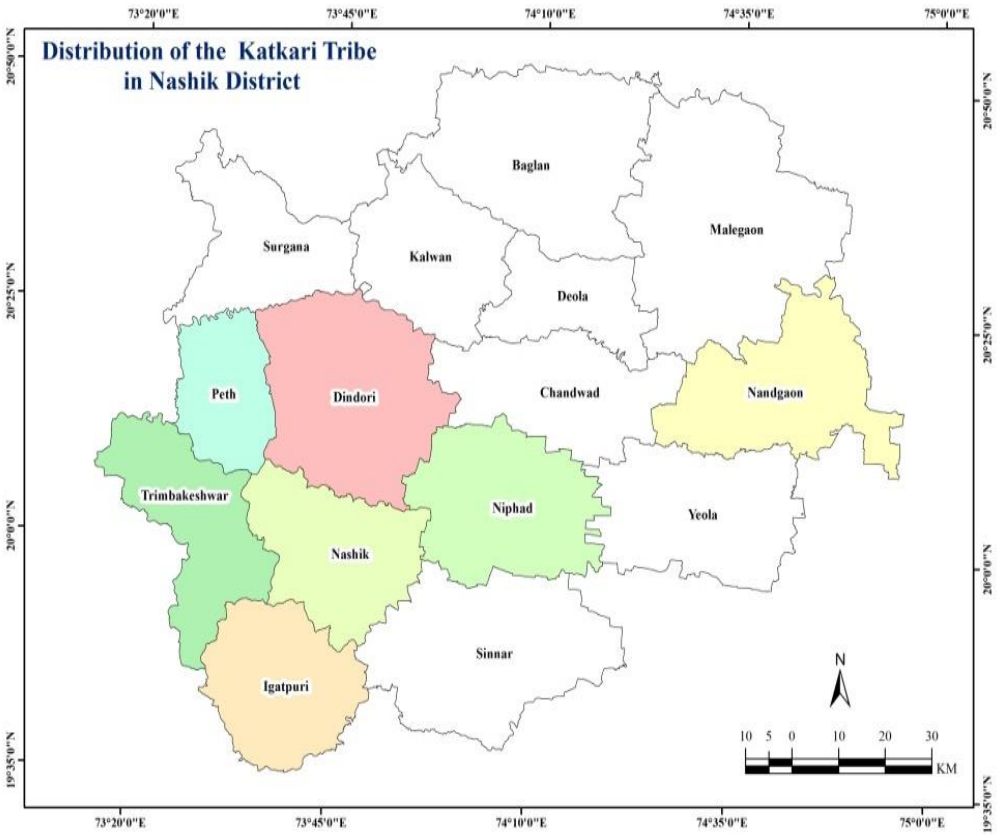
The framework can therefore be represented as follows:

Spatial Context and Resource Access
↓
Land Access + Local Employment + Accessibility + Infrastructure
↓
Livelihood and Occupational Structure
↓
Household Income and Livelihood Security
↓
Seasonal Migration
↓
Housing + Sanitation + Basic Services
↓
Intra-District Spatial Differentiation in Socio-Economic Well-Being

The framework also recognises that these components may interact in a **non-linear and mutually reinforcing manner**. For example, limited land access may increase dependence on wage employment; dependence on seasonal employment may increase migration; and recurrent migration may affect household stability and access to education and services. Households with better access to productive resources may also have better opportunities to diversify their income and to be less dependent on seasonal migration. The study has taken these dimensions for analytical purpose in terms of tehsil-wise comparative analysis and correlation analysis. The seven selected tehsils are the main spatial units. The main socio-economic indicators are literacy, occupation, income, migration, landholding, housing, sanitation and selected basic services. Correlation analysis is used to find associations between selected variables and spatial comparison is used to find out geographical differences in household conditions. The framework does not impose causal relations between the variables. Rather, it provides an analytical lens to study the relationship between variations in the socio-economic conditions of Katkari households and the variations in the geographical context and livelihood resources. This approach allows the study to transcend a generic discussion of tribal deprivation and move toward a geographically differentiated understanding of livelihood security and socio-economic well-being.

Study Area

The present study is confined to Nashik district of Maharashtra, which provides a suitable geographical setting for examining spatial differences in the socio-economic conditions of the Katkari tribe. Within the district, Katkari settlements are concentrated in seven tehsils, namely Igatpuri, Trimbakeshwar, Peth, Nandgaon, Niphad, Nashik, and Dindori. These seven tehsils represent the geographical distribution of the Katkari population considered in the present investigation. According to the field data used in the study, the seven selected tehsils contain 116 Katkari-inhabited villages, with a total Katkari population of 12,930 distributed among 2,850 households. The distribution is highly uneven across the study area. Igatpuri has the largest Katkari population, with 5,101 persons and 1,091 households, followed by Trimbakeshwar with 2,986 persons and 647 households and Peth with 2,200 persons and 446 households. In comparison, Niphad, Nashik, and Dindori have considerably smaller Katkari populations. For the present field investigation, 575 households were selected from these seven tehsils. The sample includes 220 households from Igatpuri, 130 from Trimbakeshwar, 90 from Peth, 103 from Nandgaon, 23 from Niphad, 5 from Nashik, and 4 from Dindori. This distribution provides coverage of both areas with relatively high concentrations of Katkari households and areas where their population is comparatively small.



Source: Compiled by Author from Tribal Development Department Nashik and Kalwan, 2023-24.

The selected tehsils differ considerably in their socio-economic characteristics. Nandgaon, for example, has comparatively greater participation in own farming and records a higher average household income, whereas Katkari households in Igatpuri, Trimbakeshwar, and Peth show greater dependence on wage labour and seasonal migration. These differences provide an important basis for examining the spatial differentiation of socio-economic conditions within the Katkari community. Thus, the uneven distribution of Katkari settlements and variations in socio-economic characteristics of the seven selected tehsils of Nashik district render it as an appropriate geographical framework to analyze intra-district differences in socio-economic conditions of the Katkari tribe.

Objectives of the Study

The present study aims to examine the spatial differentiation in the socio-economic conditions of the Katkari tribe in Nashik district. The specific objectives are:

1. To examine the spatial distribution of the Katkari population and households across the selected tehsils of Nashik district.
2. To analyse the tehsil-wise variations in selected socio-economic characteristics of Katkari households**,** particularly literacy, occupation, household income, migration, and housing conditions.
3. To identify the areas of relative socio-economic advantage and disadvantage among Katkari households **across** the seven selected tehsils.
4. To examine the relationship between selected socio-economic variables and identify the factors associated with spatial differences in the living conditions of Katkari households.
5. To suggest geographically targeted development measures for reducing socio-economic disparities and improving the well-being of the Katkari community in Nashik district.

Materials and Methods

1. Research Design

The study adopts a descriptive and analytical geographical research design to examine intra-district spatial differentiation in the socio-economic conditions of the Katkari tribe in Nashik District, Maharashtra. The seven selected tehsils Igatpuri, Trimbakeshwar, Peth, Nandgaon, Niphad, Nashik, and Dindori are treated as the principal spatial units of analysis. The study attempts to examine the variations and associations among selected socio-economic and livelihood indicators by tehsil-wise comparative and statistical analysis.

2. Sources of Data

The study relies on primary and secondary data. Primary data were collected using structured household questionnaires administered during direct field visits and face-to-face interviews with Katkari household respondents. Information was collected on household characteristics, literacy, occupation, income, migration, landholding and agricultural participation, housing, sanitation, and selected basic services. Secondary information was obtained from the District Census Handbook of Nashik District, Tribal Research and Training Institute (TRTI) reports, Adivasi Vikas Bhavan, Nashik, and relevant books, journals, and official records. Secondary sources were used to establish the demographic and socio-economic context of the study area and to support interpretation of the primary findings.

3. Sampling

The study population comprises Katkari households located in the seven selected tehsils. Together, these tehsils contain 116 Katkari-inhabited villages, 12,930 Katkari persons, and 2,850 households. A total of 575 Katkari households were surveyed.

Table 1. The household sample was distributed across the seven tehsils

Tehsil	Katkari Households	Surveyed Households
Igatpuri	1,091	220
Trimbakeshwar	647	130
Peth	446	90
Nandgaon	514	103
Niphad	112	23
Nashik	21	5
Dindori	19	4
Total	**2,850**	**575**

Source: Field Survey.

The sampling procedure used for the household survey was simple random sampling, as specified for the present field investigation. The sample provides representation of both major Katkari concentration areas and areas with relatively smaller Katkari populations.

4. Variables and Indicators

The analysis uses a set of socio-economic indicators representing different dimensions of household well-being. The principal variables are:

1. **Education:** literacy and educational conditions;
2. **Livelihood and occupation:** brick-kiln labour, agricultural labour, forest work, own farming, and other wage employment;
3. **Economic condition:** household income and landholding;
4. **Migration:** seasonal migration and migration-related livelihood dependence;
5. **Housing:** type and condition of dwelling;
6. **Sanitation:** availability and use of sanitation facilities;
7. **Basic services:** access to selected health and household services.

These indicators are examined at the tehsil level to identify spatial similarities and differences in Katkari socio-economic conditions.

5. Data Analysis

The collected household data were organised and analysed using **descriptive, comparative, and statistical techniques**. Frequencies, percentages, average, and tehsil-wise comparisons were used to describe the distribution of selected socio-economic indicators. Tables and graphs were used to present the spatial patterns.

The relationships among selected livelihood variables were determined using Karl Pearson's correlation coefficient (r).

The analysis particularly considers the relationships between:

1. brick-kiln labour and seasonal migration;
2. own farming and household income; and
3. Household income and seasonal migration.

The correlation results are interpreted as associations rather than causal relationships. This distinction is important because the cross-sectional design of the study does not establish causality.

6. Spatial Analytical Approach

The geographical approach forms the central analytical component of the study. The seven selected tehsils are compared to identify areas of relative socio-economic advantage and disadvantage. The analysis focuses on whether differences in land access, occupational structure, income, migration, and household living conditions correspond with geographical variation across the study area. The spatial comparison is therefore used alongside statistical association analysis to provide a more comprehensive interpretation of intra-district socio-economic differentiation among Katkari households.

7. **Ethical Considerations**

Primary information was collected through direct interaction with respondents, with attention to informed participation and confidentiality. Household-level information is presented in aggregated form and is used exclusively for academic analysis.

Results

The analysis of data from 575 Katkari households across seven selected tehsils of Nashik District reveals substantial intra-district variation in demographic, livelihood, economic, migration, and household living conditions. The results demonstrate that the socio-economic condition of the Katkari community is spatially differentiated rather than uniform.

1. **Socio-Economic profile and spatial distribution**

The Katkari population is unevenly distributed in the seven selected tehsils. The major concentration areas are Igatpuri, Trimbakeshwar and Peth while Niphad, Nashik and Dindori have relatively smaller Katkari populations. Nandgaon shows a unique trend, with a limited number of three identified villages having a sizable population of Katkari.

Table 2: Katkari Tribe Population in Nashik District

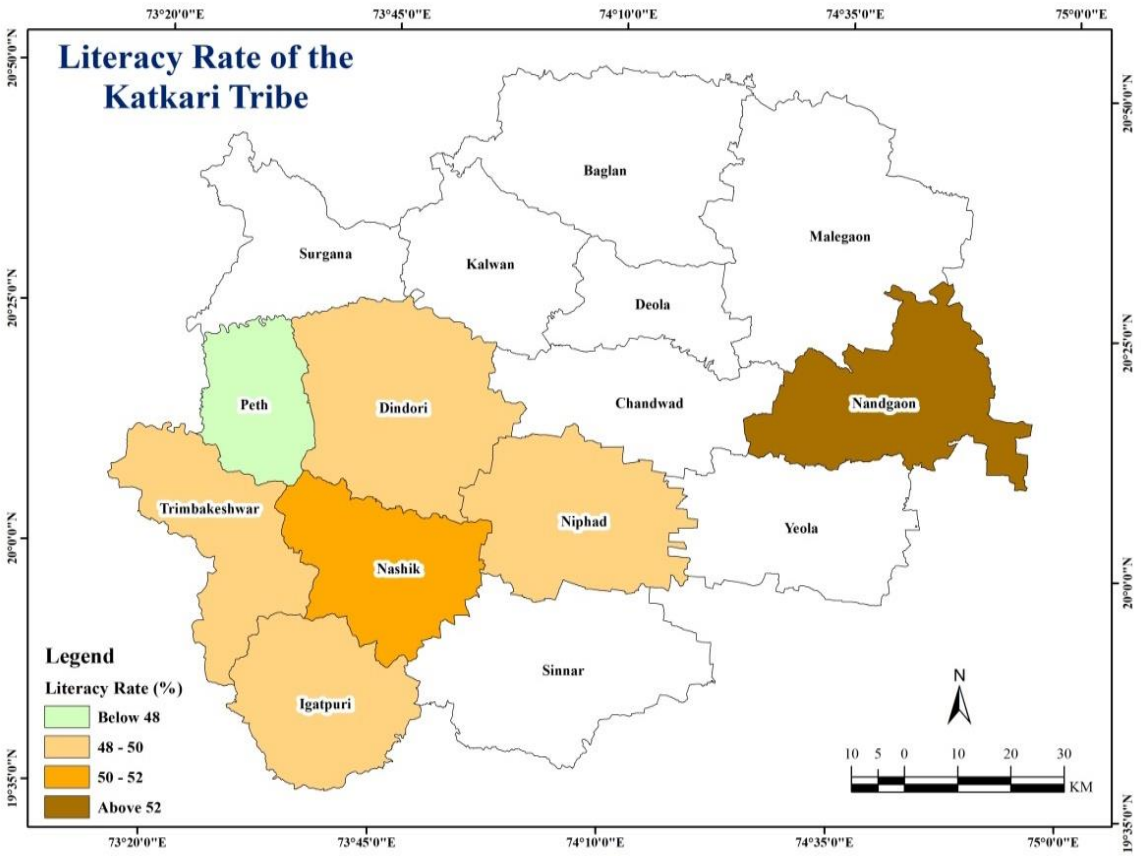
Sr.No.	Name of Tehsil	Katkari Population	Percentage
1	Igatpuri	5101	39.45
2	Trimbakeshwar	2986	23.10
3	Peth	2200	17.01
4	Nandgaon	2034	15.73
5	Niphad	439	3.39
6	Nashik	102	0.79
7	Dindori	68	0.53
	Total	**12930**	**100**

The spatial distribution of population does not correspond directly with socio-economic outcomes. Areas with larger Katkari populations do not necessarily record the most favourable socio-economic conditions. This suggests the importance of considering livelihood and household characteristics in addition to population distribution.

2. **Changes in Literacy**

Literacy rate of the surveyed Katkari population was 50.42 per cent. However, there is variation in literacy across the selected tehsils. Peth has lowest literacy rate of 47.76% while Nandgaon has highest literacy rate of 57.76%.

Sr. No	Tehsil	Male Literacy (%)	Female Literacy (%)	Total Literacy (%)	Literacy Gap (%)
1	Igatpuri	49.39	47.93	48.87	32.09
2	Trimbakeshwar	49.98	49.19	49.68	31.28
3	Peint	48.18	47.27	47.76	33.20
4	Nandgaon	58.45	57.07	57.76	23.20
5	Niphad	54.17	47.73	50.95	30.01
6	Nashik	57.14	50.00	53.57	27.39
7	Dindori	50.00	50.00	50.00	30.96
Average (%)		**51.21**	**49.61**	**50.42**	**30.54**



Source: Compiled by Author from census of India 2011and Field Survey2023-24.

The difference between the highest and lowest literacy rates shows that the educational conditions are spatially varied in the study area. Thus, the results indicate that the Katkari population cannot be considered as a homogenous group in terms of educational attainment.

3. **Occupational Structure and Livelihoods Dependence**

The occupational structure shows a high dependence on informal and wage employment. The largest occupational category of brick-kiln labor is 58.78% followed by agricultural labor, 21.39% among the surveyed households. Only 7.83 per cent of households report own farming or landholding as the principal occupation. The distribution indicates that a substantial proportion of Katkari households depend on occupations characterised by seasonal or informal employment. Dependence on brick-kiln labour is particularly important because it is closely associated with seasonal mobility. The results also show spatial differences in livelihood structure. Some households in Nandgaon are more involved in own farming. Trimbakeshwar, Peth and Igatpuri are more dependent on wage based activities.

4. **Spatial Variation in Household Income**

Average monthly household income varies considerably across the seven tehsils, ranging from **₹5,500 in Dindori to ₹9,500 in Nandgaon**. Nandgaon therefore records the highest average household income, while Dindori records the lowest. Peth also falls among the comparatively lower-income areas, while the remaining tehsils occupy intermediate positions. The spatial pattern indicates that household economic conditions differ substantially within the study area. The income differences correspond with variations in livelihood structure. Nandgaon, where some households participate in own farming and have access to agricultural land, records comparatively higher income. In contrast, areas with greater dependence on informal wage employment generally record less favourable income conditions.

5. **Spatial Differentiation in Seasonal Migration**

Seasonal migration is an important feature of Katkari livelihoods in the study area. The overall migration rate among surveyed households is 29.16%.

Table 3: Tehsil-wise Seasonal Migration among Katkari Households

Tehsil	Migrated Households (%)
Igatpuri	37.53
Trimbakeshwar	31.07
Peth	35.78
Nandgaon	13.02
Niphad	26.09
Nashik	33.33
Dindori	27.27
Overall	**29.16**

Source: Field Survey.

Igatpuri had the highest migration rate (37.53%) followed by Peth (35.78%) and Nashik (33.33%). Trimbakeshwar recorded 31.07, while Dindori and Niphad recorded 27.27 and 26.09 respectively. Nandgaon had the lowest rate of migration at 13.02%.

In many respects, Nandgaon is different from the other main areas of Katkari concentration. In Nandgaon, the rate of migration is lower while household income and participation in own farming is relatively higher. In contrast, the higher migration rates in Igatpuri, Peth, and Trimbakeshwar coincide with greater dependence on wage-based occupations.

6. **Housing, Sanitation and Access to Basic Services**

The household-level indicators further demonstrate spatial differences in living conditions. Housing conditions vary across the seven tehsils, with comparatively better conditions observed in Nandgaon and weaker conditions in areas characterised by greater dependence on informal wage employment. Sanitation is a huge area of deprivation. The study shows that 58.24% of the surveyed households practice open defecation indicating poor sanitation coverage among large proportion of the Katkari households. Open defecation is especially bad in Dindori, where all surveyed households reported practicing it. Access to health facilities is relatively better but uneven. The field survey shows that 74.22 percent of the households have access to health facilities while 25.78 percent have reported inadequate access. Thus, although most households have some access, a significant proportion still face problem in accessing health related services.

7. **Selected Socio-Economic Variables Relationships**

Karl Pearson's correlation coefficient was calculated to study the relationships between selected livelihood and socio-economic variables.

Table 3: Correlation between Selected Socio-Economic Variables

Variables	Correlation coefficient (r)	Relationship
Brick-kiln labour and migration	+0.81	Strong positive
Income and own farming	+0.63	Moderate positive
Income and migration	−0.56	Moderate negative

Source: Field Survey and author's calculation.

The strongest association is observed between brick-kiln labour and migration (r = +0.81). This indicates that higher dependence on brick-kiln employment is associated with higher levels of migration. A moderate positive association is observed between household income and own farming (r = +0.63), indicating that households participating in own farming tend to record relatively higher income. A moderate negative association is observed between household income and migration (**r = −0.56**). Thus, relatively higher-income conditions are associated with lower levels of migration, while lower-income conditions are associated with greater migration. Overall, the results demonstrate that occupational structure, land-based livelihood opportunities, household income, and seasonal migration are interconnected dimensions of Katkari socio-economic differentiation.

8. **Overall Spatial Pattern**

The results identify Nandgaon as a relatively favourable socio-economic case within the study area, characterised by comparatively higher literacy, higher household income, lower migration, and greater participation in own farming. In contrast, Igatpuri, Trimbakeshwar, and Peth show greater dependence on wage-based occupations and seasonal migration. The Dindori district is characterized by low household income and poor sanitation. The results overall indicate the intra-district variation in the socio-economic conditions of Katkari community. The differences are apparent in education, occupation, income, migration, housing, sanitation and access to basic services. The results provide the empirical basis for the discussion of the geographical and livelihood processes underlying the observed differences in the Discussion.

Policy Implications

The study's findings of spatial differentiation imply that a one size fits all development strategy may not be sufficient to overcome the varied socio-economic conditions of Katkari households across Nashik District. Hence,

policy interventions should be regionally focused and consistent with the livelihood profile and specific forms of deprivation identified across different tehsils.

1. **Enhancing Local and Land-Based Livelihoods**

The positive association between own farming and household income (r = +0.63) points to the importance of strengthening land-based livelihoods where agricultural land is available. Provision of appropriate agricultural inputs, irrigation facilities, technical guidance, access to markets and livelihood-related institutional support to Katkari households. Such measures may improve the productivity and stability of existing land-based livelihoods and reduce exclusive dependence on casual wage employment.

2. **Curtailing Overdependence on Seasonal Migration**

The positive association of brick-kiln labor with migration (r = +0.81) indicates that alternative livelihood options should be developed in or near to Katkari settlements. In areas of high migration like Igatpuri, Peth and Trimbakeshwar, focus should be on local employment generation, skill development, livelihood diversification and access to suitable income generating activities. The objective should not necessarily be to eliminate migration, since migration can provide an important source of household income, but rather to reduce dependence on migration arising from limited local livelihood opportunities.

3. **Tehsil-Specific Livelihood Planning**

The findings support a differentiated approach to development planning. Nandgaon, with relatively higher income, higher participation in own farming and less migration, provides an opportunity to build on existing livelihood assets. However, Igatpuri, Trimbak and Peth need more attention to be given for diversification of employment and livelihood security. Dindori requires particular attention to the combined problems of low household income and inadequate sanitation. Such differentiation can help ensure that development programmes respond to the actual conditions of individual settlements rather than applying identical interventions across the district.

4. **Education and Human Capital Development**

Spatial differences in literacy indicate the need for targeted educational interventions in areas with relatively lower educational attainment. The measures should focus on improving access to education, supporting retention, strengthening adult literacy and reducing the disruption of education due to seasonal migration. Educational interventions should be combined with livelihood programs since economic insecurity and household mobility can affect educational continuity.

5. **Housing, Sanitation and Basic Services**

The high proportion of households involved in open defecation (58.24%) points to the need for greater attention to sanitation infrastructure. Dindori, where the surveyed households reported complete dependence on open defecation, requires particularly focused intervention. Housing improvement should also receive attention in areas where temporary and semi-permanent structures remain prevalent. Sanitation and housing programmes should be integrated with water availability, household income support, and settlement-level infrastructure so that households can use and maintain the facilities provided.

6. **Integrated and Geographically Targeted PVTG Development**

The overall findings suggest that Katkari development planning should move from a predominantly uniform approach towards **place-sensitive planning**. Local authorities and development agencies should identify settlement-level priorities using indicators such as livelihood dependence, income, migration, literacy, housing, sanitation, and access to basic services. A spatially targeted approach can help direct resources towards areas of greatest vulnerability while strengthening existing livelihood advantages in relatively favourable areas. Such an approach is particularly relevant for PVTG development because socio-economic disadvantage is experienced differently across geographical settings.

Conclusion

The present study examined the intra-district spatial differentiation in the socio-economic conditions of the Katkari tribe in Nashik District, Maharashtra, using primary data from 575 households across seven selected tehsils. The findings reveal that the socio-economic conditions of Katkari households are not spatially homogenous, even when they belong to the same tribal community and are located in the same district. There are differences in literacy, occupational structure, household income, seasonal migration, land-based livelihoods, housing, sanitation and access to basic services.

The Katkari population is itself unevenly distributed spatially with Igatpuri, Trimbakeshwar and Peth being the major concentration areas. However, concentration of population does not directly translate into socio-economic advantage. Nandgaon is a relatively favourable case with relatively higher literacy and household income, lower seasonal migration and greater participation in own farming. Igatpuri, Trimbakeshwar and Peth are relatively more dependent on wage-based employment and seasonal migration. Dindori faces its own set of issues around household income and sanitation.

The statistical results also show the correlation of livelihood conditions. Brick-kiln work and migration are strongly positively correlated (r = +0.81), suggesting a strong association between seasonal work-dependence and household mobility. The positive association between own farming and household income (r = +0.63) points out the value of land-based livelihood opportunities. The negative correlation between income and migration (r = −0.56) shows that relatively stronger household income conditions are associated with less migration. These relationships should not be interpreted as causal relationships, but as statistical associations.

Thus the study shows that Katkari vulnerability is shaped by both community level characteristics, as well as geographical context and availability of local livelihood opportunities. Differences in access to productive resources, employment, agricultural opportunities, infrastructure and basic services contribute to different forms and degrees of socio-economic vulnerability across the study area.

The main contribution of the study is that it emphasizes spatial differentiation within districts. The study demonstrates that the Katkari community is not a geographically uniform population and different places are characterized by different combinations of livelihood insecurity and socio-economic deprivation. This finding is significant for planning tribal development.

The uniform development strategy may therefore be unsatisfactory. Development interventions need to be place-sensitive and tehsil-specific. Emphasis should be on strengthening land-based livelihoods where opportunities exist, creating local employment in high-migration areas, improving educational opportunities and addressing deficits in housing, sanitation and basic services. Such an approach can better match the development interventions to the real socio-economic conditions of the Katkari households.

To summarize, the study indicates that understanding the socio-economic well-being of PVTG communities requires attention to the location of households, access to livelihoods, and the influence of geographic differences on economic and social opportunities. A spatially differentiated approach can offer a stronger basis for designing specific strategies for livelihood security improvement and reduction of socio-economic disparities among the Katkari of Nashik District.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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