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On

Patterns and Determinants of Tribal Population Migration in the Girna and Godavari Basins in the Nashik District (MS): A Geospatial Analysis

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By

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1. Introduction:

Migration is a significant social phenomenon faced by many developing countries, presenting formidable challenges and opportunities **(Cohen, B. 2006).** The study of population migration is crucial for understanding the qualitative and quantitative changes in regional demography. Geography, particularly population geography, focuses on analyzing the distribution, growth, and mobility patterns of human populations **(Deville, P et.al 2014).** Within this context, tribal populations, often referred to as Scheduled Tribes in India, form distinct social groups with shared regions, dialects, social structures, cultural homogeneity, and religious practices. These communities belong to various ethnolinguistic groups and have a rich historical, cultural, political, economic, and technological heritage **(Kukutai, T. 2004).**

Scheduled Tribes in India are among the most marginalized social groups, facing significant social and economic disparities compared to non-tribal Populations **(Mitra, A. 2008).** High poverty rates, limited access to education and healthcare, and dependence on traditional livelihoods characterize the socio-economic status of Scheduled Tribes. The majority of tribal communities engage in primary sectors, such as agriculture, forest product collection, hunting and gathering, shifting cultivation, and artisanal manufacturing. However, these traditional livelihoods have been gradually marginalized, leading to increased reliance on agricultural labor and a decline in cultivators **(Meher, R. 2009).** "Tribal population" refers to a social group of people who share a shared region, a common dialect, a standardized social structure, cultural homogeneity derived from a common progenitor, governmental organization, and religious practices. These communities are members of several ethnolinguistic groups professing various religions. The Indian government has given the tribal groupings the new name of "Scheduled Tribe" **(Census, 1981)**. It is possible to examine the socioeconomic progress and

development of the scheduled tribes from the social, historical, cultural, political, economic, and technological angles. Tribal people have lived in the old world for many thousands of years. The earliest people in the area were tribal groups, who later became an essential part of civilization. Tribal references can be found throughout the Ramayana, Mahabharata, Puranas, and Vedas. Vanyajati (forest castes), adijamati (primitive people), janjaati (folk people), and anusuchit janjati (scheduled tribe) are the names of the tribes **(SK Tiwari – 2002).**

Migration plays a vital role in the Indian economy, with migrant labor contributing significantly to sectors such as construction, textiles, small industries, mining, and hospitality services. However, migrant workers often face social exclusion, limited rights, and a lack of political representation. Many migrants come from disadvantaged backgrounds, including Scheduled Castes, Scheduled Tribes, and Other Backward Castes, and lack access to education and social capital. They often find employment in the informal sector, which is characterized by insecurity, low wages, and limited opportunities for socioeconomic advancement. Scheduled Tribes (ST) in India are the most marginalised section among social groups in most social indicators **(MoTA, 2013).** Overall, 40.6 per cent of STs live below the poverty line, against the non-STs is 20.5 per cent **(MoHFW, 2018).** According to the 2011 Census, the main workers who are engaged in work for more than six months in a year among the STs declined by 2.2 per cent from the 2001 Census. On the other hand, marginal workers, who do not get a job for the major part of a year, increased by 1.9 per cent during 2001-11 (Census of India, 2001, 2011). Collection of forest products, hunting and gathering, shifting cultivation, pastor and nomadic herder, and creative manufacturing are the principal means of living for most of the tribes in India. In the 2011 Census, two-thirds of the STs were engaged in primary sectors. They heavily relied on farming (79 per cent) as cultivators (34.6 per cent) and agricultural labourers (44.4 per cent) **(Census of India, 2011).** It is conspicuous that cultivators among the STs declined by 10.1 per cent between the 2001 and 2011

Census, whereas agricultural labours increased by 8.0 per cent. It indicates the marginalisation of tribal livelihoods **(MoHFW, 2018).**

This proposed research aims to investigate the patterns and determinants of tribal population migration in the Girna and Godavari River Basin in Nashik District, Maharashtra. By employing geospatial analysis techniques, this study seeks to understand the spatial distribution of tribal populations, their migratory patterns, and the factors influencing their migration decisions. The research will explore the socio-economic, environmental, and demographic drivers of tribal migration, providing valuable insights into the challenges and opportunities faced by these marginalized communities. Migrant labour makes enormous contributions to the Indian economy through major sectors such as construction, textiles, small industries, brick-making, stone quarries, mines, fish and prawn processing and hospitality services. But migrants remain on the periphery of society, with few citizen rights and no political voice in shaping decisions that impact their lives **(Kabeer 2005).** Unlike countries in Southeast Asia and East Asia, the bulk of the migrant workforce in India has little or no education **(Srivastava 2003).** In fact, migrants are poorly endowed all-round: they come from poor families where access to physical, financial and human capital is limited and where prospects for improving living standards are constrained by their inferior social and political status. Historically disadvantaged communities such as the Scheduled Castes, Scheduled Tribes1 and Other Backward Castes are heavily represented in migration. Poor migrants are absorbed in informal sector jobs, much maligned for being insecure, poorly paid and unproductive but offering the only option for labourers to improve their capabilities.

The findings of this study will contribute to the existing body of knowledge on population geography, migration studies, and the socio-economic conditions of Scheduled Tribes in India. The research outcomes can inform policymakers, development practitioners, and stakeholders in designing targeted interventions to address the issues faced by tribal communities, enhance their livelihoods, and promote inclusive development in the study area.

This research endeavor aims to shed light on the complex dynamics of tribal population migration and provide evidence-based recommendations to support sustainable development and social inclusion for marginalized communities in the Girna and Godavari River Basin in Nashik District, Maharashtra.

2. REVIEW OF LITERATURE

The following review of literature provides insights into various studies that are directly or indirectly related to the patterns and determinants of tribal population migration:

Anupam Hazra (2012) conducted research on migration in India and identified push and pull factors as major categories influencing migration. The study revealed that better employment opportunities, access to education, and previous migrants were significant pull factors, while poverty, job searching, and family pressure were identified as the main push factors.

Tulika Guha, Sugata Hazra, and Sourav Das (2019) explored the potential link between environmental change and migration. They aimed to understand the relationship between increased risk of conflict and migration caused by environmental factors. This study contributes to understanding the complex dynamics between environmental change and human migration.

Shekar Mukharji (1995) focused on the challenges of imbalanced urbanization and migration from rural to urban areas. Through his research, he highlighted the issues related to poverty, unemployment, and the impact of imbalanced urbanization on metropolises in India.

Vidyarthi, L. P. (1970) examined the impact of urbanization on tribal culture and studied the socio-economic changes resulting from large-scale industrialization in the tribal belt of Chhota Nagpur. This study sheds light on the consequences of urbanization on tribal communities and their cultural dynamics.

Anjali B. Borhade (2007) conducted a project to address the socio-economic needs of seasonal migrants in Nashik, Maharashtra. The study focused on the vulnerability of seasonal migrants due to limited awareness of their rights and social isolation in the destination city.

P. Sudhakara Reddy (1995) assessed the processes, problems, and socio-cultural changes among the displaced scheduled tribe, Yanadis, in Shriharikota Island, Andhra Pradesh. This research provides insights into the challenges faced by displaced tribal communities and their socio-cultural adjustments.

Dr. Nanasaheb R. Kapadnis (2016) researched the impact of physical and socio-economic factors on the agricultural scenario of Nashik District. The study analyzed the agricultural land use and population characteristics to understand the agricultural scenario in the district.

Priya Deshingkar and Shaheen Akter (2009) explored the living and working conditions of migrant laborers in India. They highlighted the marginalization of migrant laborers, their vulnerability to exploitation, and the contribution they make to the national GDP.

Mehar Singh Gill (1981) evaluated migration patterns in an underdeveloped tract of Hissar district in Haryana. This study focused on understanding the patterns and dynamics of migration in the specific region.

Miemyle W.M. (1955) conducted research on labor mobility, emphasizing the migration of unskilled individuals to urban areas in search of employment opportunities.

Alpa Shah and Jens Lerche (2020) explored the processes of migrant labor exploitation and their role in capitalist growth. Their ethnographic research across different sites in India examined the impact of class relations, identity hierarchies, and regional geopolitics on seasonal labor migration.

Srivastava, R. (2003) made a significant contribution to the understanding of poverty and underdevelopment in India through his work titled "Poverty and Underdevelopment: An Overview." The chapter is part of the book "Poverty, Equity

and Growth in India: Measurement, Policy and Estimation," which Srivastava edited. Srivastava provides an overview of poverty and underdevelopment in India, addressing key issues related to Migration, policy, and estimation. His contribution lies in synthesizing and analyzing existing knowledge on poverty, Migration and underdevelopment, presenting a comprehensive understanding of the challenges and complexities faced by the country.

The Ministry of Tribal Affairs (MoTA), Government of India, made a significant contribution through its publication titled "Scheduled Tribes at a Glance" in 2013. The contribution of MoTA lies in its efforts to gather and present reliable data and statistics on various aspects of the tribal population. MoTA makes valuable insights into the demographic profile, educational attainment, health indicators, economic conditions, and political representation of STs.

Kabeer (2005) The study conducted by made significant contributions to the understanding of gender equality and women's empowerment within the context of the third Millennium Development Goal (MDG). Through a comprehensive analysis, the study yielded notable outcomes that have shaped the discourse on gender empowerment:

Firstly, Kabeer critically analyzed the third MDG, assessing the conceptual frameworks and strategies employed to promote gender equality.

Kathwas, A. K., & Patel, N. (2019). Effects of landuse and landcover dynamics on the migration and demographic pattern of tribal population using geospatial techniques. Theoretical and Empirical Researches in Urban Management, 14(3), 77-97. This paper investigates the spatio-temporal dynamics of LULC and demography and their inter-relationship in the different administrative blocks located within parts of Subarnarekha watershed, Jharkhand state, India, which comprises a large concentration of tribal population.

Borse and Suryawanshi (2005) The study examines the irrigation development in the Nashik District of Maharashtra from 1970 to 2005. They explore the various factors, including infrastructure, policies, and technological advancements, that

influenced the expansion and improvement of Girna and Godavari River basin and its irrigation systems in the region. The study provides a comprehensive analysis of the changes and progress made during the specified period, shedding light on the agricultural and socio-economic implications of irrigation development in Nashik District.

S K Tiwari (2002) In the book "Tribal Roots of Hinduism," Tiwari delves into the cultural and historical connections between tribal traditions and Hinduism. The book highlights the influence of tribal rituals, beliefs, and practices on the development of Hinduism, emphasizing the diversity and syncretism that has shaped the religion throughout its evolution.

Zacharia K. C. (1965) conducted a historical study on internal migration in the Indian subcontinent, analyzing patterns of migration by age and sex. The study provides insights into the population redistribution caused by migration in India.

These studies collectively contribute to our understanding of the patterns, determinants, and socio-economic implications of tribal population migration, shedding light on various factors influencing migration decisions and the challenges faced by migrant populations.

3. IDENTIFICATION OF RESEARCH GAP

The research gap in the study "Patterns and Determinants of Tribal Population Migration in Girna and Godavari River Basin in Nashik District (MS): A Geospatial Analysis" lies in the lack of comprehensive research focusing specifically on the migration patterns and determinants of tribal populations in the Girna and Godavari River Basin in Nashik District. While existing literature provides insights into migration in India, environmental factors, urbanization, socio-economic changes, and general migration patterns, there is a need for a geospatial analysis that specifically examines the migration dynamics, patterns, and socio-economic drivers of tribal populations in the study area. This research aims to fill this gap by employing geospatial analysis techniques to explore the spatial distribution of tribal populations,

understand their migratory patterns, and identify the factors influencing their migration decisions in the Girna and Godavari River Basin. Furthermore, the existing literature predominantly focuses on general migration patterns and the socio-economic conditions of migrant populations in India, but there is a dearth of research specifically addressing the tribal population migration in the study area. Tribal communities, often marginalized and facing socio-economic disparities, have unique cultural, historical, and socio-economic contexts that shape their migration patterns.

The proposed research aims to address this gap by conducting a geospatial analysis that specifically examines tribal population migration in the Girna and Godavari River Basin in Nashik District. By employing geospatial techniques, the study seeks to identify the spatial patterns of tribal migration, understand the factors influencing their migration decisions, and assess the socio-economic implications of such migrations on both the origin and destination areas.

4. IMPORTANCE AND SCOPE OF THE STUDY

The proposed study on the patterns and determinants of tribal population migration in the Girna and Godavari River Basin in Nashik District holds great importance in several aspects. Firstly, it addresses a significant research gap by focusing specifically on the migration patterns of tribal populations. While migration studies have been conducted in various contexts, there is a lack of in-depth analysis specifically related to tribal communities. This study aims to fill this gap and provide valuable insights into the migration dynamics of these marginalized groups. Secondly, understanding the challenges faced by Scheduled Tribes in India is crucial for addressing social and economic disparities. By examining the migration patterns of tribal populations, this research contributes to a deeper understanding of the unique challenges and opportunities they encounter. It sheds light on the socio-economic factors, environmental influences, and policy interventions that shape

their migration decisions. Such knowledge is essential for designing targeted interventions that can enhance their livelihoods and promote inclusive development. The study's utilization of geospatial analysis techniques adds another dimension to the research. By incorporating spatial data and analyzing migration patterns from a geographical perspective, it enables the identification of spatial patterns, hotspots, and trends in tribal population migration. This geospatial approach enhances the accuracy and precision of the study's findings, providing a comprehensive understanding of the distribution and movement of tribal populations.

Moreover, the research outcomes of this study have practical implications for policymakers, development practitioners, and stakeholders involved in tribal welfare and development. The evidence-based recommendations derived from the study can inform the design and implementation of targeted interventions to address the specific challenges faced by tribal communities in the study area. It can guide policy decisions related to infrastructure development, socio-economic empowerment, and environmental management.In addition to its practical implications, this study also contributes to the existing body of knowledge on population geography, migration studies, and the socio-economic conditions of Scheduled Tribes in India. By providing insights into the migration patterns and factors influencing the decisions of tribal populations, it expands our understanding of migration dynamics and their implications for marginalized communities. This knowledge contributes to academic research and can be utilized by scholars and researchers in related fields.

This study holds significance in geospatial analysis, providing a comprehensive understanding of tribal population migration, and offering practical insights for policymakers and development practitioners. It aims to promote sustainable development, enhance the well-being of marginalized tribal communities, and foster social inclusion in the Girna and Godavari River Basin in Nashik District.

5. STUDY AREA

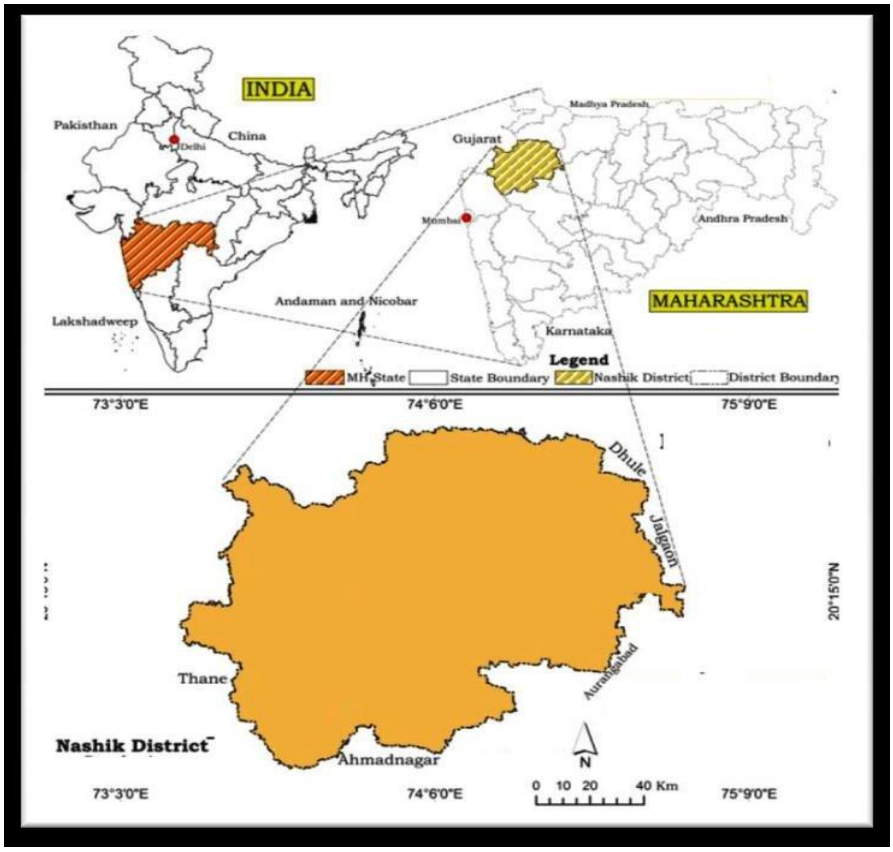

Fig.01. Location Map of Study Area

Nashik District is situated partly in the Tapi basin and partly in the upper Godavari basin. It lies between $19^0\,35'\,18''$ North latitude to $20^0\,53'\,07''$ North latitude and $73^0\,16'\,07''$ East longitudes to $74^0\,56'\,22''$ East longitudes. It is surrounded by Dhule district in the North, Jalgaon and Aurangabad district in the East, Ahmednagar district in the South, Thane district in the South-West and Gujarat state in the North-West. Nashik district has an area of 15530 sq. km. and population of 6,109,052, as per the 2011census. There are 15 Tahsils and 66 revenue circles are in the Nashik district.

In the western half of the district, there is the main Sahyadri hill stream, which travels north-south. Three imposing spurs extend off from the main Sahyadri range in the east. The Selbari range, which is located in the far north, roughly delineates the border between Nashik and the Dhule district. The Satmala and Ajanta ranges,

which completely encircle the district, come next. It serves as a watershed between the Godavari and its tributaries to the south and the Girna and its tributaries to the north, which drain towards the Tapi. While some of the ranges have conical tops and uneven slopes, others have flat tops and regular slopes. As per Census, 2011 the district its population is 61, 07,187. While the area of the district accounts for 5.05 percent of the total area of the State, the District population constitutes 5.43 percent of the total State's population. The density of population is 393 persons per sq. km. the district ranks 3rd in terms of area, 4th in terms of population and 7th in terms of density. In this research we basically focus on Girna and Godavari River basin. The climate here is very healthy and fragrant. Temperatures range from 20° C to 30° C, although at the peak it can reach 35 ° C in May. Temperatures rise from late February to May. It starts decreasing from June to August. The study area shows moderate rainfall with high variability. The average rainfall in the district is 600 mm to 700 mm. Rainfall is mainly from June to September.

6. AIMS AND OBJECTIVES

1. To study the Physio-socio-cultural features of the study region.
2. To identify the spatio-temporal patterns of tribal population migration within the Girna and Godavari basins.
3. To explore the determinants influencing tribal population migration.
4. To identify potential challenges and opportunities associated with tribal population migration in the study area.

7. HYPOTHESIS

There is a significant specific patterns, spatial trends and particular determinants indicating changes in tribal population migration over a specific time period within the Girna and Godavari Basins in the Nashik District.

8. DATA BASE

Data base mainly around the secondary sources of census data and agricultural.

a) Population Data: Various sources collected Population data. The information relates to migration patterns and labor force characteristics, age, economic activity, occupation, employment status, population density, Population Growth, Sex Ratio, Population Distribution, Literacy, Households, Religion, relationship between tribal literacy and working population and others. Details of the data gathered from the sources listed below are mentioned below.

1. Government of India (www.censusindia.gov.in)
2. International Institute for Population Sciences (IIPS) (www.iipsindia.ac.in)
3. Nashik District (www.nashik.gov.in)
4. National Sample Survey (NSS)
5. Ministry of Tribal Affairs

b) Remote Sensing and GIS Data: Geospatial data, such as satellite imagery and GIS datasets, can be used to analyze the spatial distribution of tribal populations, land use patterns, and environmental factors influencing migration data obtained from Sources like the National Remote Sensing Centre (NRSC) and state-level remote sensing agencies.

c) Other Data Sources:

1. State government departments: State government departments such as the Department of Tribal Development, Department of Agriculture, and Department of Environment may have data and reports related to tribal populations, agricultural practices, and environmental factors in the study area. These departments can be contacted to access relevant data and reports.

2. Local surveys and studies: Local surveys and studies conducted by researcher in the study area can provide specific data on tribal population migration, livelihood patterns, and socio-economic conditions. These local-level studies can offer contextual information and insights into the unique dynamics of tribal migration in the Girna and Godavari River Basin.

3. The Socio-Economic Abstract of Nashik District: Data used for various socio-economic indicators, including population, education, employment, and migration. Utilizing this data in the study helps analyze the demographic and socio-economic characteristics of tribal populations, their migration patterns, and the factors influencing migration decisions in the Girna and Godavari River Basin.

9. METHODOLOGY

Methodology Different research methods are used for results analysis they are showing as followed. Mean, Median, Standard Deviation, and Coefficient of Variation: These methods are used to calculate the central tendency, variability, and relative variability of the data.

1. **Mean:** The mean is calculated as the sum of all data points divided by the total number of data points in the sample. The equation for the mean is:

$$\mu = \Sigma xi / n$$

2. **Median:** The median is the value that separates the upper and lower halves of the data. It is calculated by arranging the data in ascending order and finding the middle value. If the number of data points is even, then the median is the average of the two middle values.

3. **Standard Deviation:** The standard deviation measures the amount of variation or dispersion of the data around the mean. The equation for the standard deviation is:

$$\sigma = \sqrt{[\Sigma(xi - \mu)^2 / (n - 1)]}$$

4. **Coefficient of Variation:** The coefficient of variation is a measure of relative variability that is calculated as the ratio of the standard deviation to the mean. The equation for the coefficient of variation is:

$$CV = (\sigma / \mu) \times 100\%$$

5. **Linear Regression:** Linear regression is used to establish a linear relationship between two variables. The equation for linear regression is:

$$y = a + bx$$

where y is the dependent variable, x is the independent variable, a is the intercept, and b is the slope of the line.

9. **Index of Ageing =** Population Aged 60 + Years/ Population Aged (0-14) X 100
10. **Moving average:** The moving average method involves calculating the average of a set of data points over a specific period of time. The moving average can be calculated for any period, such as daily, weekly, or monthly. This method is useful in smoothing out the noise in the data and identifying long-term trends.
11. **Census data analysis:** Census data provides valuable information on population movements and can be used to analyze intra-state migration patterns. The data could be analyzed to identify trends, patterns, and characteristics of migration such as age, gender, education, and occupation.
12. **Survey Research:** Conducting surveys could provide insights into the motivations and experiences of migrants. Surveys could be used to collect information on why people migrate, where they migrate from and to, and the challenges they face during the migration process.
13. **Geographic Information Systems (GIS):** GIS could be used to map the spatial patterns of intra-state migration and analyze the geographic factors that influence migration. GIS could also be used to map the distribution of services, amenities, and resources that are important to migrants.

14. **Population Density:** Population density is defined as the total population in a given area divided by the total area in square kilometres. The equation for population density is,

    Population Density = Total Population in given area / Total Area

15. **Total Dependency Ratio:** The total dependency ratio is the ratio of the population that is dependent on others to the population that is not dependent. It is calculated using the following equation:

    Total Dependency Ratio = (Population aged 0-14 years + Population aged 65 years and above) / (Population aged 15-64 years)

16. **World Bank Living Standards Measurement Study (LSMS) Migration Module:** This is a survey module designed to collect information on the migration patterns, motivations, and outcomes of individuals and households. The LSMS also includes questions on the socio-economic characteristics of migrants and their households.
17. **Migration and Remittances Household Surveys (MaRHS):** This is a standardized survey developed by the World Bank to collect information on the characteristics, motivations, and outcomes of migrants and their households. The MaRHS also includes questions on the socio-economic characteristics of households, as well as the impact of migration on household income and well-being.
18. **Software's:** The research will use a variety of cartographical, quantitative, remote sensing, GIS, and GPS approaches; for this aim, software like Global Mapper, Corel draw, ArcGIS, QGIS and MS office these Software will be used for data analysis & preparation of maps.

The study employs various statistical methods and Spatial analysis, conduct spatial analysis using GIS to identify any spatial patterns and

relationships between Tribal people migration. This analysis could include techniques such as hotspot analysis, cluster analysis, and spatial regression.

19. **t - Test:** -A t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups, which may be related in certain features. It is mostly used when the data sets, like the data set recorded as the outcome from flipping a coin 100 times, would follow a normal distribution and may have unknown variances. A t-test is used as a hypothesistesting tool, which allows testing of an assumption applicable to a population. A t-test looks at the t-statistic, the t-distribution values, and the degrees of freedom to determine thestatistical significance. To conduct a test with three or more means, one must use an analysis of variance.

10. EXPECTED OUTCOMES OF THE STUDY

i. This research will help shape new goals and policies for people in the local area.

ii. Will help in nurturing the cultural elements of tribal people in the study area.

iii. This research will promote the development of the field of study.

iv. There will be a change in the tribal peoples well being

v. The concept of local job creation will be created by reducing the migration of Tribal people.

vi. The migration of tribal people will be reduced in some cases.

11. DESIGN OF RESEARCH WORK

Chapter 1st : Appraisal of the problem

Chapter 2nd : Physical, social, and cultural features of the study area.

Chapter 3rd : Migration patterns of tribal population in Girna and Godavari River basin

Chapter 4th : Determinants influencing tribal population migration

Chapter 5th : Potential challenges and opportunities associated with tribal migration

Chapter 6th : Summary and recommendations

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