

Population Growth, Urbanization and Landuse Pattern in Gondia District of Maharashtra State, India

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ABSTRACT

Population is an important resource for development. Present work attempts to assess the correlation between population growth, urbanization and general landuse change over two decades (1990-91 to 2010-11) in Gondia district of Maharashtra state and suggest the possible ways and remedies to improve the future landuse of the study area. Gondia are the highly concentrated towns of the study area. It is has been observed that the growth of population increased 10.14 Times while urbanization increased 57.52 Per cent during 2001 to 2011. Increasing population, industrial development and trade is bringing about a great pressure on land. The environmental conditions are favorable for agriculture in the study region. Forest area has decreased while Cultivable waste land fallow land increased during 2000-01 to 2010-11. Land put non-agricultural use, barren and non cultivable land and net sown area has also subsequently declined during the span of two decades. Thus landuse is a dynamic phenomenon in the study area. While In Vidarbha region Gondia District is rich in forest resources. The largest land use category in the district is that of agriculre. Precarious forest constitutes 90% of total are under forest which is maximum in south east and central parts. The total area under forest in the district was 2833 sq. kms. out of 5641 sq. kms total geographical area in 2011. It has been observed that the district having 50.22 per cent area still remain under forest. Forest resources contribute significantly to the economy of the district. This district shows the better condition of forest Resources. In 1981 25.04% of the total geographical area was under forest. It has increased to 32.72% in 2011. The socio-economic characteristics of the study area population growth, industrialization, nearness to daily markets and developments of road network have caused the general landuse changes in the area.

Keywords: Population Growth, Urbanization, General Landuse, Forest Resources

I. INTRODUCTION

Population affects the environment mainly through changes in land use and industrial metabolism. Land use is causing various forms of environmental degradation. "Urbanization is characterized by movement of people from small communities concerned chiefly or solely with agriculture to other communities generally larger, where activities are primarily centred in management, manufacturing, trade and allied interest." Urbanization has brought forth several maladies and suffering to human kind, besides bringing economic and cultural development in its fold. Today land use change is attributed mostly to growth of population, urbanization and industrialization [1, 2, 3, 4]. Land use is a product of interaction between a society's cultural background, state, and its physical needs on the one hand, and the natural potential of land on the other [5, 6, 7, 8]. The land use pattern of a region is an outcome of both natural and socio-economic factors and their utilization by man in time and space. Land use data are needed in the analysis of environmental processes and problems that must be understood if living conditions and standards are to be improved or maintained at current levels [9, 10].

II. STUDY AREA

Gondia district of Maharashtra has been selected for the studying. The district was formed on 1st May 1999 when it was separated from Bhandara district. It lies on Gondia-Mumbai railway route and it is 1060 kms. away from Mumbai. It is one of the main rice growing areas of the state. Gondia district lies from 20040' to 21038' north latitude and 79047'to 80042' east longitude. The shape of the district is nearly rectangular. The total area of the district is 6205 square kilometers, which is about 1.83% of the area of the state. According to 2011 census, the total population of the district is 13,22,331. The total area of the district is divided into Eight Tahsils. (Table No. 1 and fig no. 1) The district is rich in forest products. Collection of

tendu leaves and making of bidis is the main occupation of the district. Geologically, the district is very rich in mineral products. The district has a significant physical variety. There are hilly areas as well as alluvial plains. The hilly areas lie in many directions such as in the North Western part of the district lie "Gaimukh" hills and in the south west there is Pratapgrah rang. Navegaon hills are in the central part. There are Chichgarh hills in Deori Tahsils while Darekasa hills are in the north east. These hills are part of the extension of Satpura mountain ranges.

Amidst the hilly areas, there are some river Basins. Wainganga [11, 12, 13, 14] is the main river and forms the district boundary in the north east and central parts of the district. There is another river, namely Pangoli, which flows towards north and joins the Bagh River [15, 16, 17, 18]. In the central part, Chulbandh and Gadavi are other important rivers [23, 24]. Thus the district has topographic differences. Most of the hilly areas are covered with forests while rice is cultivated in the river basins. In rural areas cultivation is a major activity wherever it is possible.

LOCATION MAP

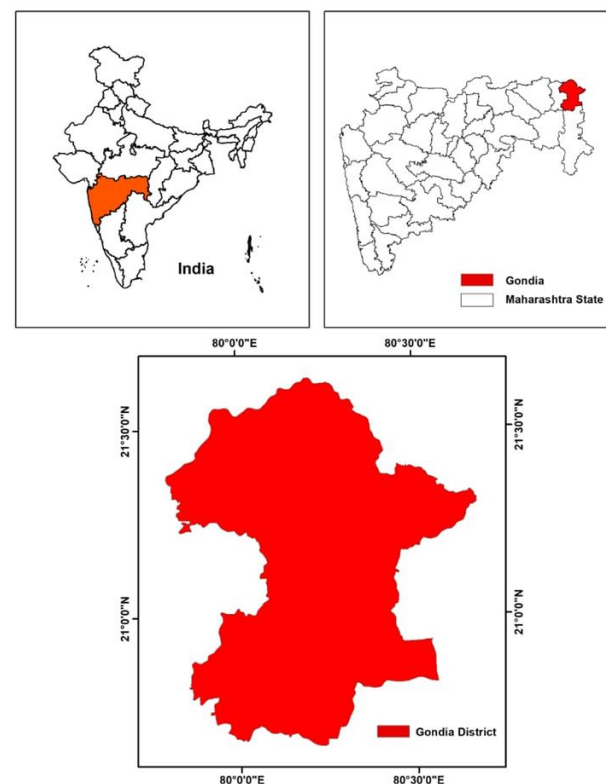


Fig. No. 1 : Gondia district Location Map

The average rainfall of the district is between 1300-1600 mm. The lowest rainfall occurs in the north western part. It increases towards east and south where the hilly areas lie. The climate is generally pleasant and salubrious. In the district, the length of the broad gauge railway line is 206 kms., similarly there are roads covering 465 k.m. in the district. Mumbai-Kolkata national highway (N.H. No. 6) passes through the district.

III. OBJECTIVE OF THE STUDY

- 1) The main objective of this paper is to analyse land use changes and to understand the relation with population and urbanization growth in Gondia District of Maharashtra State.
- 2) The other objective of this present study is to understand density of population, and to study the decadal population growth and density distribution in Gondia district of Maharashtra.

IV. DATABASE AND METHODOLOGY

For the present study data set compiled from various secondary sources are used to study the levels, trends and differentials for study region. It includes information on population growth, urbanization and land use pattern. Most of the demographic and land use data are taken from Census publications (Directorate of Census operation Maharashtra) for different time periods under study. The land use classification and forest data are compiled from various reports of the i.e. socio-economic bulletin of the Gondia district (2002-03, 2009-10, 2011-12). Population density, measured as number of persons per square kilometer, is used as an indication of population pressure. The most common measure of urbanization i.e. the level of urbanization is measured by the percentage of the population living in the urban areas. However, the final paper will discuss about the data used in this paper, and the methodological issues while analyzing the trend of population growth and changes in land use.

V. RESULT

Trends of population Growth in Gondia district, 1901-2011

The twentieth century has been a century of unprecedented population growth, economic development and environmental change. For which there has been extensive debate worldwide on the relationship between population growths, depletion of resources in the past few years. The world population grew by four times from 1.6 billion to 6.1 billion persons during 1900 to 2000 (United Nations, 2001). Gondia is the 7th least populated district in the state, with a population of only 1322507. The growth and nature of other factors show the spatial differences because they are affected by socio economic factors. In 1999 Gondia district was separate. Table No. 1 gives the population of Gondia district and its variation at each census since 1901 to 2011 [19, 20, 21, 22]. During this period population has increased by 732249 in the study region. The decades following the 1951 have seen great changes. Even the poorest people experienced some improvements in their living conditions. For example, average levels of calorie availability and income have risen. Water supplies and sanitation facilities and rural electrification have well progressed. In addition, the control of certain communicable diseases has been important. Thus the reduction in the death rate after 1951 resulted in a significant rise in the rate of population growth, which reached almost 20.32 during 1951-61. In this context, Gondia district population growth after 1961 can be classified into the following two phases: 1961-71: Rapid high growth 1981-2011: High growth with sure signs of slowing down of the growth rate. (Table No.1 & Figure No.1)

Table No.1: Trends of Population Growth in Gondia District (1901-2011)

Census Year	Total Population	Growth rate of Population
1901	590258	--
1911	688463	16.64
1921	620328	09.89
1931	827558	33.41
1941	966677	16.81
1951	1057678	9.41
1961	1272638	20.32
1971	1585580	24.59
1981	1837577	15.89
1991	2107629	14.70

2001	1200707	10.87
2011	1322507	10.14

Source: Census Report Gondia District 2001-2011.

It is clear that population is growing at a rapid rate during the decades from 1911 to 1971 except 1921 and 1951, but there is decrease in growth rate of population during 1981 to 2011. Population continues to grow from beginning of the 20th century except 1921 and 1951 till 1971, but there is decrease in percentage after that continually till 2011 [23, 24, 25, 26].

From 2001 to 2011 the population increased by 10.14 percent. The maximum growth of 33.41 percent was recorded in 1931 while the lowest growth rate of 9.41 percent recorded in 1951. (Table No.1 & Figure No.2)

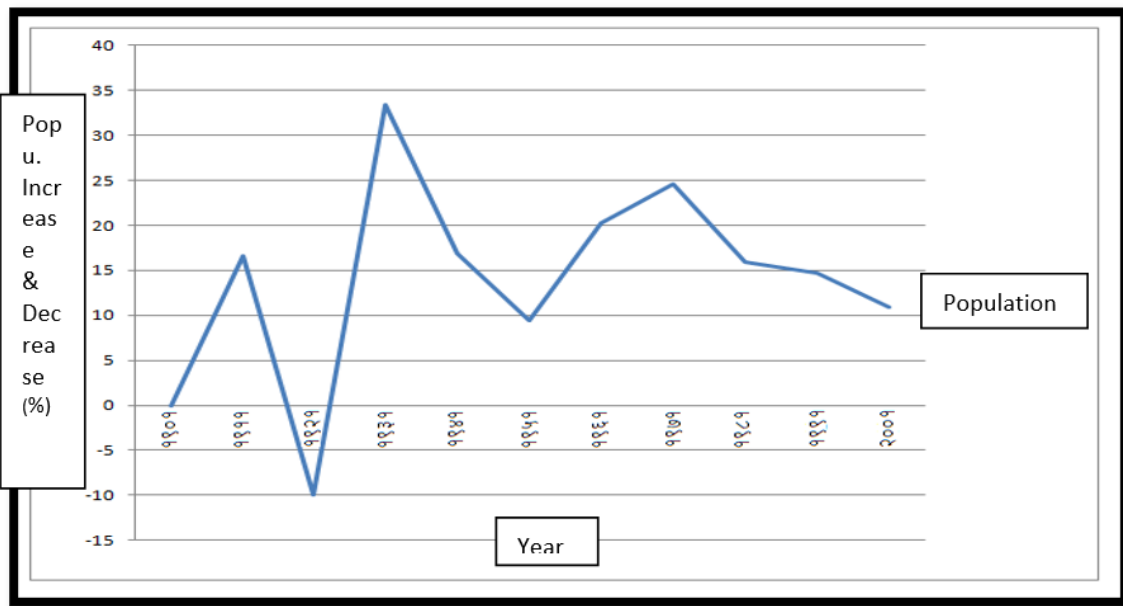


Figure. 2 : Gondia District : Population Growth (1901-2011)

Density and Urbanization

The population of the district in March 2011, stood at 13,22,331 persons. The district average density is 213 per Sq. k.m. and in 2001 to 2011 decade the growth of population is 5.97-10.12%. In 1991 the density of population in the district was 183 per s.q. kms. It increased to 194 in 2001. The density of population during two decades (2001-2011) has increased by 213 persons per sq. km. (Table No.2).

Table No.2 : Density & Urbanization in Gondia District (1991 to 2011)

Census Year	Population				Population Density		Urbanization	
	Total	Rural	Urban	Growth rate of Population	Population Density (Sq. k.m.)	Decadel Density Growth (Sq. k.m.)	(%)	Decadel Growth (%)
1991	1086221	956242	129979	--	183	--	11.47	--
2001	1200707	1057276	143431	10.54	194	06.01	11.95	+0.48
2011	1322507	1096577	225930	10.14	213	09.79	17.01	+5.06

Source: 1) Census of Gondia District 2001-2011. 2) Computed by author.

VI. METHODS AND MATERIAL

Gondia is a district Head quarter (HQ), so population density of Gondia tahsil is more than others. There is very low population density in Deori tahsil. During 2001, Gondia district had an average density of 194 persons per sq. km. This is lower than the state average density of 314 persons per sq. km. within the district; Gondia is the most thickly populated tahsil, where density is 568 persons per. Sq. km. On the other hand Deori has least density with 78 person per./sq.km. It is due to unfavorable condition i.e. high hilly region, Natural vegetation unproductive land and large scale outmigration are observed, the population growth and density is low. (Table No. 2) During 2011, Gondia district has an average density of 213 persons per sq. km. This is lower than the state average density of 370 persons per sq. km. Gondia is the most thickly populated Tahsil with a density of 645 persons per sq. km. On the other hand Deori has least density with 87 person per./sq.km. Where industrialization and urbanization are visible there is population growth and an increase in population density tahsils are Gondia (645). Urbanization, involving a change in pattern of human settlements, is by far the most important social transformation that has taken place in recent times [27,

28, 29, 30, 31]. In 1991 the percentage of urbanization was 11.47 % and this number has increased to 11.95% in 2001. It shows very little change from 1991 to 2001. While in 2011 urbanization has increased by 17.01%. It has increased maximum during the decade 2001 – 2011. The migration of rural population for employment in the urbanized area from surrounding villages or districts or states is more in this area, this is one of the reason of high growth of population. (Table No.2)

The Land use Pattern of the Region

Land use is the application of human controls in a systematic manner indicating and intimate relationship between prevailing ecological condition and man. Before spelling out the relationship between population growth and land use, it appears appropriate to discuss about land use data. The physical, economic and institutional framework taken together determines the pattern of land use of a region at any particular time. In other words, the existing land use pattern in different regions in the district has been evolved as the result of the action and interaction of various factors taken together, such as the physical characteristics of land, the structure of resources like, capital and labour, available and the location of the region in relation to other aspects of economic

development, e.g. those relating to transport as well as industry and trade.

Gondia district is having with the total geographical area of 517807 ha, out of the cultivable land is 235476 ha (45.47%) and actual cultivated area is 226248 ha (43.69%). Cultivable wasteland area in the district is 65570 ha, barren and uncultivable land is 15718 ha and forest area is as high as 215928 ha (41%) Out of total geographical area 226115 ha soil which is very good cultivable land, 180505ha land is categorized as good cultivable land; moderately good cultivable land is 91774 ha. Fairly good land suitable for occasional cultivation is 19718ha. Table 3 depicts the land use classification [32, 33, 34, 35, 36].

Table No.3 Land use Pattern in Gondia District

Particulars	Area (ha)
Area under forests	215928
Cultivable area (Ha)	235476.86
Cultivated Area (Ha)	226248.37
Cultivable Waste Land	65570.75
Current Fallow Land	13492.18
Land put Under non agriculture use	21898.20
Net area under irrigation	103213
Land use under misc. Plantation	18074.27
Barren and uncultivable land (Waste)	15718.86

Source: Department of Agriculture Government of Maharashtra Comprehensive District Agriculture Plan, Gondia (C-DAP: 2012-13 to 2016-17).

Forest cover comprises of deciduous forests, degraded forests, forest blanks and recent plantations. Deciduous forest largely spreads out in the region in the east of the district. Waste land with or without scrub and barren rocky/stony waste also be found in the region. The change in the nature of the forest cover in the district is seen from the two images given below.

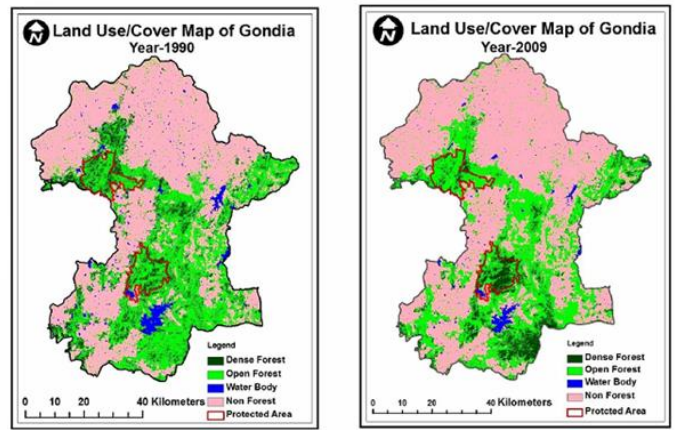


Fig 3: Land use

As seen from the maps, the northern area of the district has suffered the most in terms of the decline of forest cover [37, 38, 39, 40]. Similarly in the eastern margin, there are areas where the forests which have been destroyed due to human interference. This has become more serious as the corridors of forests are destroyed, which has put the limits to the movement of the wild animals, birds and even spread of plants. Therefore these corridors have to be maintained properly to allow this movement [41, 42, 43, 44]. In the northern boundary most of the forest has been cleared; it is because of the railway lines and conversion to cultivated land. When the cultivated land is transferred to some non agriculture use, the forest land is acquired for cultivation. Similarly it is true about the grazing land [45, 46, 47, 48, 49, 50, 51].

VII. CONCLUSION

It is concluded that the growth of population and urbanization is continuously and steadily increasing in the study area. It is clear that population continues to grow from beginning of the 20th century accept 1921 and 1951 till 1971, but there is decrease in percentage after that continually till 2011. From 2001 to 2011 the population increased by 10.14 percent. The density of population increased from 183 persons to 213 persons per sq. km. during 1991 to 2011. Looking at the result of this study, the district has a lesser population density as compared to the state average. Where

VIII. REFERENCES

industrialization and urbanization are visible there is population growth and an increase in population density. On the other hand tahsils where unfavorable condition i.e. high hilly region, Natural vegetation unproductive land and large scale outmigration are observed, the population growth and density is low. The large number of people residing in the northern part and the belt of the high population extends in the space direction. In the district south west parts and in the south east parts of the southern region which show sparse population. Gondia is predominately rural district with only two urban centers and 90% population depends primarily on agriculture. The major land use categories in district include buildup land and agricultural land that comprises of generally *kharif*, *rabi* and double crop system in the region. Forest resources contribute significantly to the economy of the district. Nagzira, 152 sq km and Navegaon, 133 sq km are the national reserve forests. Bamboo, tendu leaves and teak wood are the main resources of the district. District is having with the total geographical area of 517807 ha, out of the cultivable land is 235476 ha (45.47%) and actual cultivated area is 226248 ha (43.69%). Cultivable wasteland area in the district is 65570 ha, barren and uncultivable land is 15718 ha and forest area is as high as 215928 ha (41%) out of total geographical area. To reduce the high pressure of population on land, the decentralization of small scale industries is essential in the study area. The finding of such detailed studies would be useful for future socioeconomic planning as well as for planning population control in specific terms. Thus the present paper has brought out the decadal population growth, density and land use for the district. The results obtained can serve as useful input for better management and planning strategies of Gondia district in the future.

- [1]. Bahekar, N.K. and Maskare, Yeshwant S. (2012): Population Growth Types in Gondia District Of Maharashtra State : 2001-2011, The Goa Geographer, Vo. IX No. 1, Dec.2012, Pp. 67-70.
- [2]. Maskare YS (2015) A Geogrphical Study of Changing Pattern of Population Characteristics In Gondia District (1991-2001) (Unpublished Ph. D Thesis).
- [3]. Lalita S Roychoudhary, NK Bahekar, YS Maskare (2014) Enviroment And Health In India, Internation Journal of Researxh in Bioscience, Agriculture &Technology, Issue-2, Valuem-II, ISSN 2347-517.
- [4]. Bahekar, N.K. and Maskare, Yeshwant S. (2013): Current Status of Forest Resources In Gondia District (Maharashtra) The Goa Geographer, Vol 97-102.
- [5]. Kudnar NS (2022) Geospatial Modeling in the Assessment of Environmental Resources for Sustainable Water Resource Management in a Gondia District, India. In: Rai P.K., Mishra V.N., Singh P. (eds) Geospatial Technology for Landscape and Environmental Management. Advances in Geographical and Environmental Sciences. Springer, Singapore. https://doi.org/10.1007/978-981-16-7373-3_4
- [6]. Rajasekhar M, Sudarsana Raju G, et al (2021) Multi-criteria Land Suitability Analysis for Agriculture in Semi-Arid Region of Kadapa District, Southern India: Geospatial Approaches, Remote Sensing of Land, 5(2), 59-72. <https://doi.org/10.21523/gcj1.2021050201>
- [7]. Rajasekhar M, Gadhiraaju SR, Kadam A et al. (2020) Identification of groundwater recharge-based potential rainwater harvesting sites for sustainable development of a semiarid region of southern India using geospatial, AHP, and SCS-CN approach. Arab J Geosci, pp 13-24. <https://doi.org/10.1007/s12517-019-4996-6>
- [8]. Rajasekhar M, SudarsanaRaju G, SiddiRaju R (2019) Assessment of groundwater potential zones in parts of the semi-arid region of Anantapur District,

- Andhra Pradesh, India using GIS and AHP approach. *Model. Earth Syst. Environ.* 5, 1303–1317. <https://doi.org/10.1007/s40808-019-00657-0>
- [9]. Bahekar, N.K. and Maskare, Yashwant.S. (2018): “Spatial Analysis of Cultivable Waste Land in Pangoli Basins (Gondia District Maharashtra)”, *Vidhyawarta, Interdisciplinary Multilingual Refereed Journal*, MAH MUL/03051/2012, Special Issue Jan. 2018, ISSN 2319 9318, Pp 165-165.
- [10]. Deshmukh, K. P. and Maskare, Yeshwant.S. (2015): “Indian Population Present Scenario and Projected Population”, *International Recognized online Multidisciplinary Research Journal*, “Indian Streams Research Journal ISRJ”, Volume 4, Issue. 9. ISSN: 2230-7850 Oct - 2014 pp.1-7. Available on at www.isrj.net.
- [11]. Kudnar NS (2020a) GIS-based assessment of morphological and hydrological parameters of Wainganga river basin, Central India. *Model. Earth Syst. Environ.* 6, 1933–1950, <https://doi.org/10.1007/s40808-020-00804-y>
- [12]. Kudnar NS (2020b) GIS-Based Investigation of Topography, Watershed, and Hydrological Parameters of Wainganga River Basin, Central India, *Sustainable Development Practices Using Geoinformatics*, Scrivener Publishing LLC, pp 301-318. <https://doi.org/10.1002/9781119687160.ch19>.
- [13]. Kudnar NS, Rajasekhar M (2020) A study of the morphometric analysis and cycle of erosion in Wainganga Basin, India. *Model. Earth Syst. Environ.* 6, 311–327. <https://doi.org/10.1007/s40808-019-00680-1>.
- [14]. Bhagat, Ravindra and Bisen Devendra (2016) Land use and Land cover of Wainganga River in Maharashtra using GIS and Remote sensing technique, *Golden Research Thoughts, International Recognition Multidisciplinary Research Journal* ISSN: 2231-5063, Volume - 5 | Issue – 9, Page No. 1-7.
- [15]. Kudnar NS (2017) Morphometric analysis of the Wainganga river basin using traditional & GIS techniques. Ph.D. thesis, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, pp 40–90.
- [16]. Bahekar, N.K. and Maskare, Yeshwant S. (2018): Spatio - Temporal Analysis of Sex Ratio In Gondia District of Maharashtra, *INTERNATIONAL JOURNAL OF RESEARCHES AND Analytical Reviews IJRAR*, 5-4, pp 321-327.
- [17]. Kudnar NS (2018) Water pollution a major issue in urban areas: a case study of the Wainganga river basin. *Vidyawarta Int Multidiscip Res J* 2:78–84.
- [18]. Kudnar NS (2019) Impacts of GPS-based mobile application for tourism: A case study of Gondia district, *Vidyawarta Int Multidiscip Res J* 1:19-22.
- [19]. Census Hand book (2001&2011 Soft Copy).
- [20]. Lillesand, T. Kiefer, R. Chipman, J.W. (2004). *Remote Sensing and Image Interpretation* New York: Wiley.
- [21]. Ade V.V (2019): Farmers' Suicide In Vidarbha Region Of Maharashtra State: A Geo-Political View, *Think India Journal*, pp-12723-12732.
- [22]. Ade V.V (2020): Farmers' Suicide In Marathawada Region Of Maharashtra State: A Geo-Political View, *Our Heritage*, Vol-68-Issue, pp- 10251-10263.
- [23]. Kudnar, N., Rajashekhar, M. (2023). Using Geo-Spatial Technologies for Land and Water Resource Development Planning: A Case Study of Tirora Tehsil, India. In: Balaji, E., Veeraswamy, G., Mannala, P., Madhav, S. (eds) *Emerging Technologies for Water Supply, Conservation and Management*. Springer Water. Springer, Cham. https://doi.org/10.1007/978-3-031-35279-9_15
- [24]. Kudnar, N.S., Mishra, V.N., Rajashekhar, M. (2023). Hydro-Chemical Characterization and Geospatial Analysis of Groundwater for Drinking and Agriculture Usage in Bagh River Basin, Central India. In: Rai, P.K. (eds) *River Conservation and Water Resource Management. Advances in Geographical and Environmental Sciences*. Springer, Singapore. https://doi.org/10.1007/978-981-99-2605-3_6
- [25]. Bhagat, Ravindra and Bisen Devendra (2015) Flood Study of Wainganga River in Maharashtra Using GIS & Remote Sensing Techniques, *International Journal of Science and Research*, 782-785.

- [26]. Gadekar D.J, Sonkar S. (2020) Statistical Analysis of Seasonal Rainfall Variability and Characteristics in Ahmednagar District of Maharashtra, India. *International Journal of Scientific Research in Science and Technology*, 2395-6011, doi : <https://doi.org/10.32628/IJSRST207525>
- [27]. Gadekar D.J, Sonkar S. (2021). The Study of Physico-Chemical Characteristics of Drinking Water: A Case Study of Nimgaon Jali Village, *International Advanced Research Journal in Science, Engineering and Technology*, 8, 61-65.
- [28]. Bhagat R.S., Kudnar N.S. and Shinde H.D. (2021) GIS-Based Multi-criteria Approach towards Sustainability of Rainfall distribution and Flood hazard Areas in Wainganga River in Maharashtra, India, *Maharashtra Bhugolshastra Sanshodhan Patrika*, Vol. 38, No.2, pp 39-46
- [29]. Bisen, D.K., and Kudnar, N.S. (2013) A Sustainable Use and Management of Water Resource of The Wainganga River Basin: - A Traditional Management Systems. figshare. Journal contribution. <https://doi.org/10.6084/m9.figshare.663573.v1>
- [30]. Bisen, D.K., Kudnar, N.S. (2013) Watershed development: a case study of drought prone village darewadi source, review of research [2249-894x] d, pp-1-6.
- [31]. Bisen D.K and Kudnar N.S. (2019) *Climatology*, Sai Jyoti Publication, Nagpur. pp-11-211.
- [32]. Borude S. and Gaikwad S.D. (2014) Application of Spatial Variation Urban Density Model: A Study of Ahmednagar City, Maharashtra, India, *Research Journal For Interdisciplinary Studies*, Pp-2081-2090.
- [33]. Dongare VT, Reddy GPO, Maji AK et al(2013) Characterization of Landforms and Soils in Complex Geological Formations-A Remote Sensing and GIS Approach. *J Indian Soc Remote Sens* 41, 91-104. <https://doi.org/10.1007/s12524-011-0195-y>
- [34]. Kudnar NS(2015a) Linear aspects of the Wainganga river basin morphometry using geographical information system. *Mon Multidiscip Online Res J Rev Res* 5(2):1-9.
- [35]. Kudnar NS (2015b) Morphometric analysis and planning for water resource development of the Wainganga river basin using traditional & GIS techniques. *University Grants Commission (Delhi)*, pp 11-110.
- [36]. Bahekar, N.K. and Maskare, Yashwant S. (2015): Educational Infrastructure In Gondia District (M.S.): Spatial Analysis, *International journal of Researchers in Social Sciences and Information Studies* 44-59.
- [37]. Kudnar N. S. (2016) "Topographic Characteristics of the Wainganga River Basins Using GIS & Remote Sensing Techniques" *Multidisciplinary Research Journal, Indian Streams Research Journal*, 5- pp 1-9.
- [38]. Kudnar NS., Padole MS, et al (2021) "Traditional crop diversity and its conservation on-farm for sustainable agricultural production in Bhandara District, India", *International Journal of Scientific Research in Science, Engineering and Technology*, 8 -1, pp. 35-43, doi : <https://doi.org/10.32628/IJSRSET207650> .
- [39]. Kumar BP, Babu KR, Rajasekhar M et al (2020) Identification of land degradation hotspots in semiarid region of Anantapur district, Southern India, using geospatial modeling approaches. *Model. Earth Syst. Environ.* (2020). <https://doi.org/10.1007/s40808-020-00794-x>
- [40]. Salunke V. S., Kudnar N. S. et al., (2020) Application of Geographic Information System (GIS) for Demographic Approach of Sex Ratio in Maharashtra State, India, *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, Volume 8 Issue XI, pp-259-275.
- [41]. Salunke V. S., Bhagat R. S. et al., (2020) *Geography of Maharashtra*, Prashant Publication, Jalgaon, pp-1-229.
- [42]. Kudnar NS, Diwate P et al (2022) Spatio-temporal variability and trend analysis of rainfall in Wainganga river basin, Central India, and forecasting using state-space models *Theoret Appl Climatol*, 150,1-2, pp 469-488. <https://doi.org/10.1007/s00704-022-04168-4>

- [43]. Salunke V.S, Lagad S.J et al. (2021) "A Geospatial Approach to Enhance Point of the Interest and Tourism Potential Centers in Parner Tehsil in Maharashtra, India", International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET), Volume 8 Issue 1, pp. 186-196, <https://doi.org/10.32628/IJSRSET218136>
- [44]. Salunke V. S. (2019) Study of urbanization Trends in Western Maharashtra, Maharashtra Bhugolshastra Sanshodhan Patrika, 36-2, pp 67-71.
- [45]. Salunke V. S., Lagad S.J. et al., (2020) Geography of India, Prashant Publication, Jalgaon, pp- 1-300.
- [46]. Bisen D, Kudnar N. Borude S et al. (2022) Geo-Spatial Modeling in the Assessment of Environmental Resources for Sustainable Water Resource Management in a Semi-Arid Region: A Case Study of Bhandara District, India International Journal of Scientific Research in Science, Engineering and Technology 9-4, pp. 286-299 <https://doi.org/10.32628/IJSRSET229445>.
- [47]. Bahekar, N.K. and Maskare, Yeshwant S. (2017): Distribution And Density of Population in Gondia District of Maharashtra, International Journal Of Researches In Social Sciences And Information Studies, 5-2, pp 1-6.
- [48]. Maskare, Yeshwant S. Raychoudhari L. (2018): Female Work Participation In Gondia District (M. S.): A Geographical Analysis, International Journal Of Researches And Analytical Reviews Ijrar, 5-4 pp 87-91.
- [49]. Kudnar NS (2022) Geospatial modeling in the assessment of environmental resources for sustainable water resource management in a semiarid region: A GIS approach, Current Directions in Water Scarcity Research, 7, 135-151. <https://doi.org/10.1016/B978-0-323-91910-4.00009-1>
- [50]. Maskare, Y.S., (2008): "Effects of Geographical factors on the distribution of Population in Gondia District", unpublished M.hil. Dissertation, University of Tilak Maharashtra University, Pune.
- [51]. Sitaram Uttamrao Anpat (2023) "Decadal Variation in RuralUrban Populations and its Socio-economic impact on Gondia District of Maharashtra",

International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395- 6011, Volume 10 Issue 1, pp. 412-422, JanuaryFebruary 2023. Available at doi : <https://doi.org/10.32628/IJSRST2310146> Journal URL : <https://ijsrst.com/IJSRST2310146>

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