

# Spatial and Temporal Analysis of Land Use Pattern of Sirohi District

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## ABSTRACT

Land is one of the most important natural resources on which all human activities depend. Land holds an important and central place in human existence and development. After the arrival of man on the earth's surface, man has used land and its related resources in many ways to fulfill his physical, social, cultural, economic and spiritual needs.

The study of land use pattern is of utmost importance, because it presents before us a picture of intensive use, minimal use and unused use of a certain geographical area. The concept of land use is related to the use of land, for which the land is used for some reason for a certain period of time. Land use refers to the use of different areas of the earth by humans. Generally, to indicate the economic activities of man on any part of the land, it is divided into categories like forest land, agricultural land, fallow land, pasture land etc. The general land use pattern of any area is the result of the influence of various factors. In fact, land use pattern is a very complex and dynamic concept.

To conduct a comprehensive spatio-temporal comparative examination of the general land use pattern of Sirohi district, the land use pattern for the period from 2000-01 to 2020-21 has been analyzed at the tehsil level. The general land use pattern is classified as forest land, land available for agriculture, uncultivated land other than fallow land, fallow land, net sown area, area sown more than once and cropped area.

**Keywords:** Natural resources, Pattern, Geographical, Economic activity, Fallow land.

## Introduction

Man uses land for obtaining food, clothing, shelter, producing many goods and services for his own consumption or market exchange, for his own transportation and transportation of goods, for tourism and entertainment, for obtaining aesthetic pleasure, for social enjoyment. This has been done in the form of attaining position and prestige at the level, spiritual satisfaction, claiming territorial sovereignty etc. J.W. According to Fox- "Land use is a process of exploiting land for a specific purpose."

Generally, to indicate the economic activities of man on any part of the land, it is divided into categories like forest land, agricultural land, fallow land, pasture land etc. The general land use pattern of any area is the result of the influence of various factors. The specific differences found in land use are closely related to the physical environment. Apart from this, socio-economic factors are also responsible for shaping the land use of any area. The ever-changing human-environment relationship also plays an important role in determining the land use of a particular area. In fact, land use pattern is a very complex and dynamic concept. This pattern of land use is not uniform but varies from one area to another.

Current patterns of land use are the result of long-term effects of environmental factors, but are also modified by social, economic and historical factors.

### **Sources of data and Methodology**

The present research is based on data and information collected from various secondary sources. Secondary data are collected from various official sources ranging between years 2000-01 to 2020-21. The data for the period from 2000-01 to 2020-21 has been taken from the State Statistics Directorate and the office of the District Collector (Land Records), Sirohi, which has been converted into percentage of the total geographical area of the study area. To avoid fluctuations in the data obtained, an average of three years' data has been used for analysis. This analysis gives a proper understanding of the general land use pattern and its relevant aspects which can provide a basis for further land use investigation. An appropriate methodology is an essential part of any research, as it helps in proper analysis of data. To investigate various aspects of land use pattern in the study area, appropriate descriptive, qualitative and cartographic techniques of analysis have been included in this research work.

### **Factors affecting land use pattern**

Land use is the result of physical, social, cultural, economic and technological factors. Elevation, temperature, rainfall, humidity etc. are physical factors, which affect the land use of a region or region. Human factors not only influence land use but also control and determine land use. Social, economic and political factors create the human environment and control and direct the extent of land use.

### **Physical factors**

Physical factors like relief, temperature, humidity, soil etc. play an important role in forming the land use pattern of any region. Relief has a direct impact on land use, especially through unevenness of height and slope. It also modifies climate in general and rainfall in particular. The slope of an area indirectly affects agricultural land use in a significant way through irrigation and groundwater supply. Under the indirect effect of slope, changes related to climate and soil are manifested in the form of underground water level, development of soil, air flow in the soil etc. Of all the geographical influences to which humans are subject, climate appears to be the most powerful factor. Relief can affect land use through its effect on climate (as temperatures drop with altitude).

### **Economic and Technological factors**

Economic factors and policies affect land use by changing prices, taxes and subsidies on land use-related investments and products, by changing production costs and transportation costs, and by changing capital flows and investment, credit, access, trade and technology. Changes in land use from past to present have been largely due to changing conditions of the economy. The increasing demand for land for population, settlement, transportation, industrial and commercial establishments and restaurants has also affected the land use pattern to a great extent.

### **Demographic factors**

There is a very close relationship between population and land use, such as - change in population pattern affects land use, then land use determines the pattern of agricultural population. As a result of the continuous increase in population, on the one hand, there has been an increase in the demand for more

agriculture, housing, transport network etc., on the other hand, there has been continuous encroachment on forest land, pasture land, barren land or cultivable land. The increase or decline in population of an area or region affects the land use of that area in the long run. Migration is the single most important demographic factor affecting land use and migration interacts with government policies, changes in construction patterns, economic integration and globalization. The growth of urban aspirations, urban-rural population distribution and rapid expansion of urban areas are important factors changing local and regional land use.

**Social and Institutional factors**

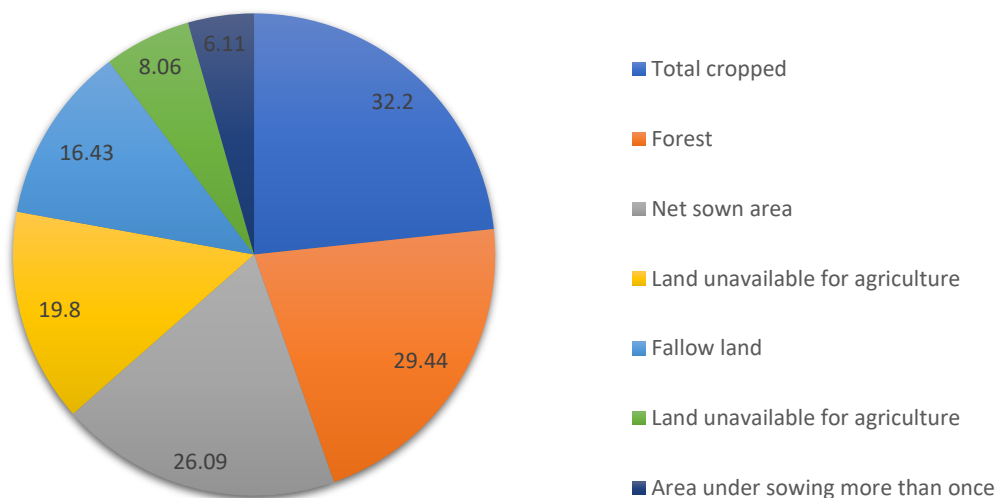
Traditions, customs, religion and social structure of a country or region also have an impact on land use. Land use is directly influenced by political, legal, economic and traditional institutions and their reactions and interactions with individual decision making. Access to land, labour, capital, technology and information are shaped by local and national policies and institutions.

**Spatial and Temporal distribution of land use pattern (2000-01 to 2020-21)**

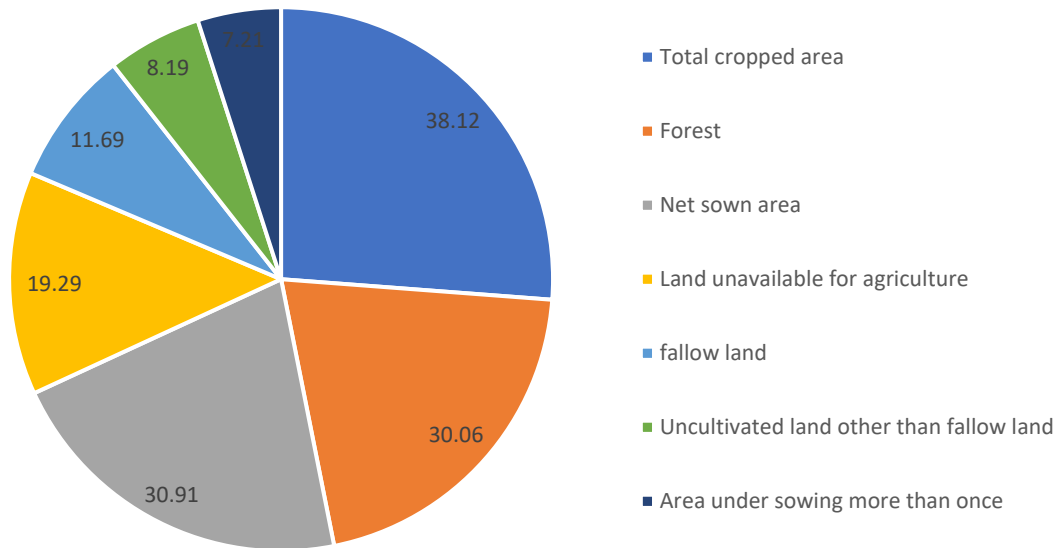
In terms of study and analysis the general land use pattern is broadly classified on the following basis – forest, land not available for agriculture, uncultivated land other than fallow land, fallow land, net sown area, sown more than once. Cultivated area, total cropped area. There have been several significant changes in the land use pattern of Sirohi district in the period from 2000-01 to 2020-21. Socio-economic development during this period has played a very important role in bringing about changes in land use patterns.

Sirohi district is considered to be a very small district of the state in terms of geographical area, only 1.51% of the total geographical area of the state comes under Sirohi district. By doing spatial and temporal analysis of land use pattern of the district, it is known that in the last two decades (from 2000-01 to 2020-21), many significant changes are seen in various types of land use. The spatial and temporal distribution of land use pattern at the district level is shown through the pie chart given below.

**2000-01 (Area in percent)**



2020-21 (Area in percent)



In comparison to 2000-01, a positive increase of 3,231 hectares has been recorded in the forest area in the district in 2020-21. In 2020-21, the total forest cover in the district was 1,55,726 hectares, which was 30.06 percent of the total reported area of the district. Overall, in terms of forest area, the condition of the district is considered better as compared to the country and the state. Again, considerable variations are visible in the forest cover and percentage of land area at the tehsil level.

Looking at the temporal and spatial distribution of land unavailable for agriculture, it is known that in comparison to 2000-01, there has been a total decrease of 2,595 hectares in 2020-21. In 2020-21, 99,963 hectares of area in the district was included under the above land, which was 19.29% of the total reported area of the district. Again, there is considerable disparity in the land available for agriculture tehsil wise.

From the point of view of uncultivated land other than fallow land, a positive growth of 684 hectares has been recorded in the district during the study period. In 2020-21, 42,465 hectares of land was included under this category, which was 8.19% of the total reported area of the district. Again, there are disparities in the temporal and spatial distribution of uncultivated land other than fallow land in all the tehsils of the district.

In terms of fallow land in the district, a significant decrease of 24,532 hectares has been recorded in 2020-21 as compared to 2000-01. The reason for the said reduction in fallow land is the use of fallow land for expansion of irrigation facilities and other works. In 2020-21, fallow land was spread over 60,589 hectares of the total reported area of the district, which is 11.69% of the total geographical area of the district. This reduction in the percentage of fallow land shows that due to development work in various areas in the district, fallow land has started being used for agriculture and other purposes. Again, significant changes have been observed in the extent and area of fallow land in the last two decades in all the tehsils of the district.

Under net sown area, a significant positive growth of 24,983 hectares has been recorded in 2020-21 as compared to 2000-01. In 2020-21, 1,60,125 hectares of land was included under net sown area in the district, which is 30.91% of the total reported area of the district. However, compared to the state and

national level, the percentage of net sown area in the district is quite low. Again, there are considerable disparities in the spatial and temporal distribution of tehsil-wise net sown area in the last two decades.

The area under sowing more than once has marked an increase of 5,704 hectares in 2020-21 as compared to 2000-01. In 2020-21, 37,367 hectares of land was included under this category, which is about 7.21% of the total reported area of the district. Again, the distribution of area sown more than once in all the tehsils of the district is also not uniform. However, in the last two decades (study period) in the district, positive growth in the expansion and distribution of sown area has been recorded more than once due to the efforts of expansion of irrigation facilities, use of technology, mechanization in agriculture, land reform etc. in the district.

Finally, a very significant and remarkable increase of 30,687 hectares has been recorded in the total cropped area of the total geographical area of the district during the study period. In 2000-01, 1,66,805 hectares and in 2020-21, 1,97,492 hectares were included under the total cropped area, which are 32.20% and 38.12% respectively of the total reported area of the district. Although this percentage is very low compared to the country and state level, yet with time, development in the agricultural sector and fulfillment of other human needs have led to a gradual increase in the land under the total cropped area. Again, disparities are also visible in the spatial and temporal distribution of total cropped area in all the tehsils of the district.

Through Table given below, a comparative study of the spatial and temporal distribution of tehsil-wise land use pattern at the district level has been shown –

**Table : Tehsil wise distribution of land use pattern**

S N	Tehsil	Aboroad		Pindwada		Reodar		Shivganj		Sirohi		Total	
	Total geographic area (in hectares)	88404		113609		108886		89528		117520		517947	
	Type of land	2000-01	2020-21	2000-01	2020-21	2000-01	2020-21	2000-01	2020-21	2000-01	2020-21	2000-01	2020-21
1	forest	64.24	66.31	36.28	36.25	15.05	15.05	20.67	22.26	16.65	16.66	29.44	30.06
2	Land unavailable for agriculture	13.43	12.11	22.64	22.48	17.64	17.56	19.31	17.68	24.20	24.46	19.80	19.29
3	Uncultivated land other than fallow land	3.56	2.87	8.39	8.71	10.65	10.14	8.15	8.66	8.66	9.54	8.06	8.19
4	Fallow land	4.16	3.91	8.23	6.39	23.03	11.55	18.20	15.20	26.12	20.14	16.43	11.69

5	Net sown area	14.5 8	14.8 9	24.4 2	26.2 0	33.6 0	45.7 7	33.6 4	36.2 3	23.6 3	29.7 0	26.0 9	30.9 1
6	Area sown more than once	2.77	3.14	2.61	4.81	12.1 8	20.1 4	7.69	3.81	5.17	3.20	6.11	7.21
7	Total cropped area	17.3 6	18.0 3	27.0 5	31.0 1	45.7 8	65.9 1	41.3 4	40.0 5	28.8 0	32.9 0	32.2 0	38.1 2

Source - Office of the District Collector (Land Records), Sirohi

Note - Area in percentage

### Conclusion

There is a lot of spatial-temporal variation in the land use pattern of Sirohi district. The proportion of forest land is higher in tehsils with discontinuous and undulating topography, whereas tehsils with flat terrain and developed agricultural infrastructure are developed from agricultural point of view.

The proportion of land unavailable for agriculture is higher in tehsils that are more urbanized, where land transport networks are developed, while the proportion of land available for agriculture is lower in tehsils that are deprived of socio-economic progress. The highest proportion of fallow land is found in the western sandy dry parts of Sirohi and Shivganj tehsils of the district, in the dissected hills of Aravali and in areas with dry climate.

The percentage of net sown area, area sown more than once, total cropped area and cropping intensity is found to be highest in those tehsils of the district which have flat terrain, expansion of advanced and developed irrigation facilities, fertile soil etc. Areas are included. On the other hand, the minimum proportion of land of this category is found in the tehsils of the district having rough, mountainous and plateau terrain, uneven areas, areas of infertile soil, lack of irrigation facilities and areas deprived of agricultural technology.

Sirohi district has generally experienced many changes in agricultural land pattern during the study period due to improved access/accessibility, improved agricultural practices and better implementation etc. The increasing demand for food and increasing population pressure have given further impetus to this process. With the passage of time, more rapid and unexpected changes can be observed in the study area. The ever increasing food demands of the people can be met by improving agricultural technology along with planning for sustainable agricultural development.

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