

The Influence of Landforms and Slope on Agricultural Cropping Patterns in Sambhajinagar District

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Article Info	ABSTRACT
Article History: Received: 23rd Sep 2025 Accepted: 08th Oct 2025 Published: 22nd Oct 2025 Keywords: Landforms, Agricultural, Cropping Patterns.	This paper examines the weighty influence of landforms and slope on agricultural cropping patterns in Sambhajinagar district, Maharashtra. Utilising a mixed-methods approach, such as Geospatial evaluation and area observations, the observer displays a correlation between the district's topography and its agricultural output. The fertile, flat plains of the Godavari basin are predominantly used for water-intensive crops like sugarcane and cotton, supported by substantial irrigation. In assessment, the hilly and undulating terrain within the north and west, characterised by higher soils and steeper slopes, is suitable for drought-resistant plants, including bajra and diverse pulses. The study concludes that information about these geomorphological elements is vital for developing sustainable agricultural strategies that support the local landscape and ensure long-term food security.
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Introduction:

Sambhajinagar district, located at the Deccan Plateau, has a diverse topography, starting from the fertile river basins to the hilly zones of the Satmala and Ajanta stages. This geographical diversity creates a complex agricultural phenomenon where farming practices are heavily dictated by the physical environment. Landforms and slope aren't just functions of the landscape; they are vital determinants of soil erosion, water retention, and the feasibility of mechanization. Whilst the district's agricultural output is large, there's a lack of certain analysis on how precise geomorphological capabilities immediately form cropping selections. This paper aims to fill this hole by presenting a comprehensive look at the ways landforms and slope dictate the form of plants cultivated in one-of-a-kind elements of the district.

Objectives:

To analyse the relationship between major landforms and the dominant cropping patterns.

Methodology:

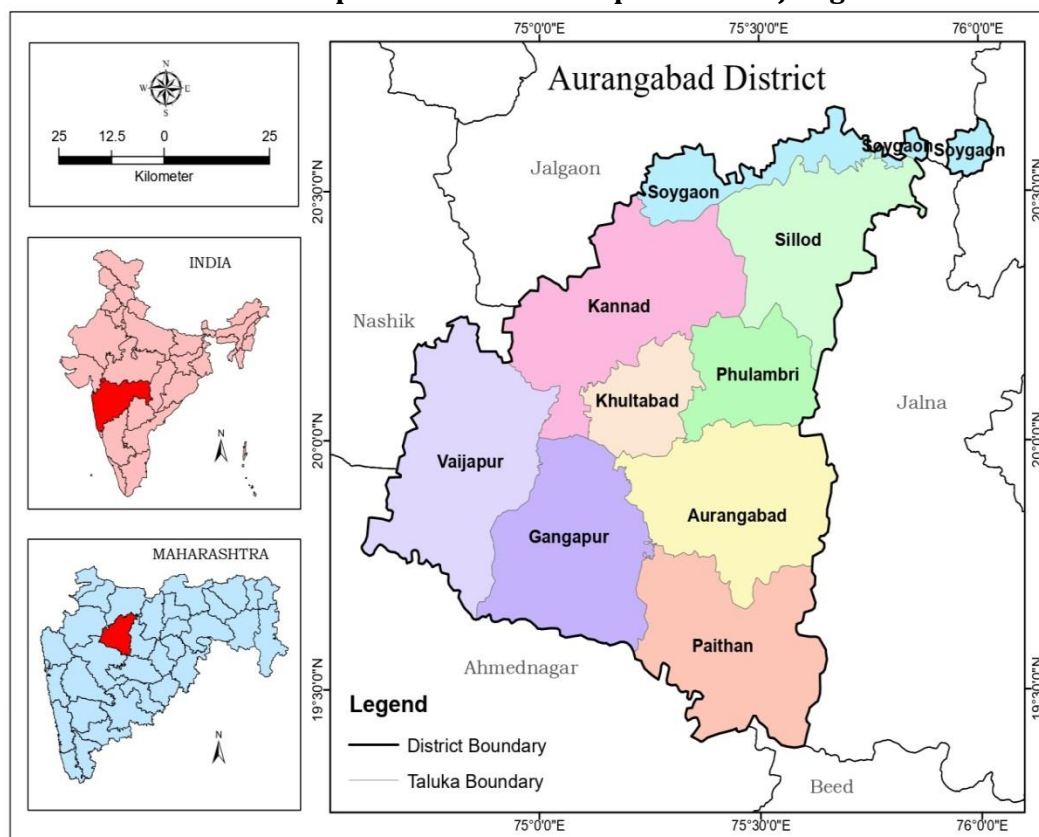
This research uses a combined-methods technique. Geospatial evaluation was used to overlay a virtual elevation model (DEM) of Sambhajinagar district with land use and cropping sample maps. This allowed for the spatial correlation of topographical capabilities with specific agricultural activities. Field surveys and farmer interviews had been performed in selected villages representing special landform regions (e.g., flat plains close to Paithan and hilly areas near Kannad) to accumulate qualitative information on farming practices and crop alternatives.

Study Area:

Sambhajinagar district, located in the central part of the state, is an elevated land that has been incised by the Godavari River and its tributaries in the southern part. Except for a little part in the north and north-west, it belongs to the Tapi drainage. The entire district is in the Godavari basin. The Sambhajinagar district measures between 19°53' north to 20°40' north latitude and 74°39' east to 76°40' east longitudes. It is bounded by the Jalna district to the east. Nashik district to the west, Ahmednagar district to the southwest, and Jalgaon district to the north. It also has small boundaries with the Buldhana district in the north-east and the Beed district in the south.

Sambhajinagar district covers an area of 10,100 km², out of which 37.55% is urban and 62.45% is rural, and it accounts for 3.28 percent. As per the recommendations of the Sukhtnor committee of the district, Aurangabad, Gangapur, Kannad, Paithan, Khultabad, and Vaijapur are included in the drought zone.

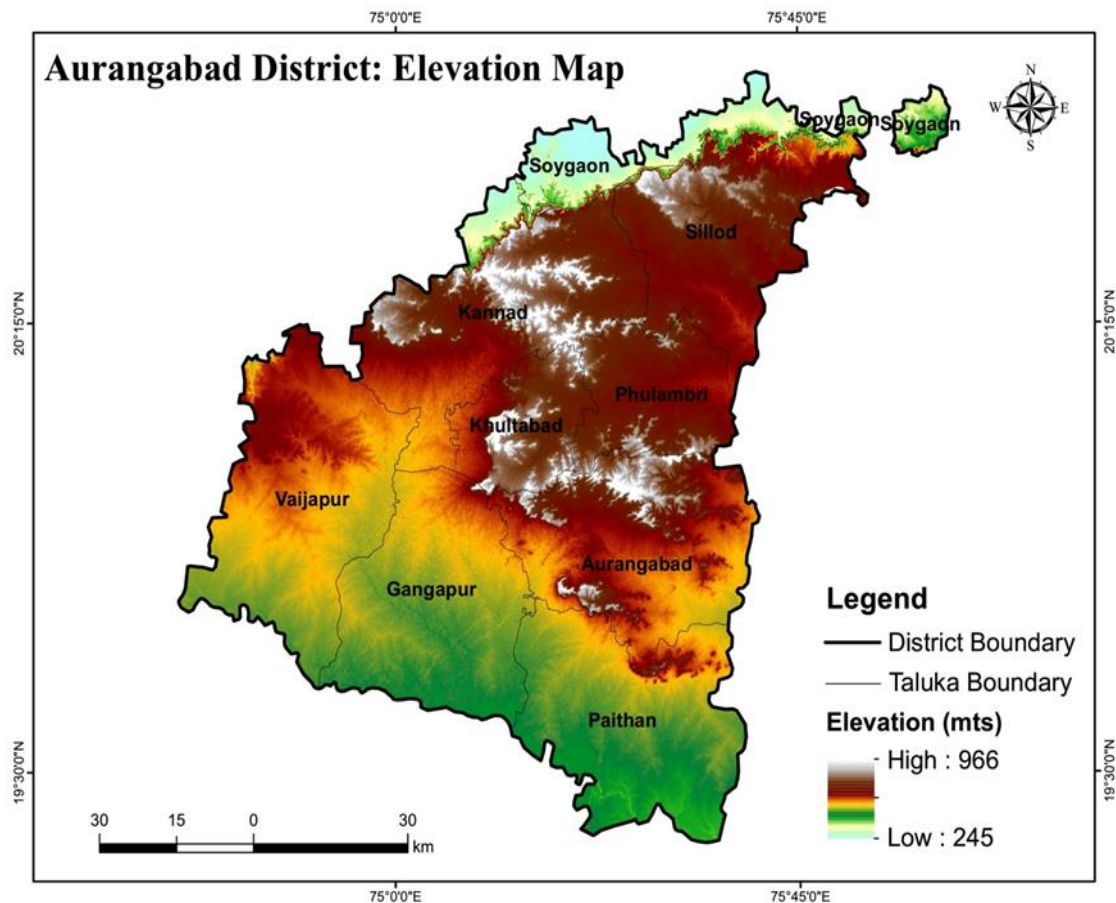
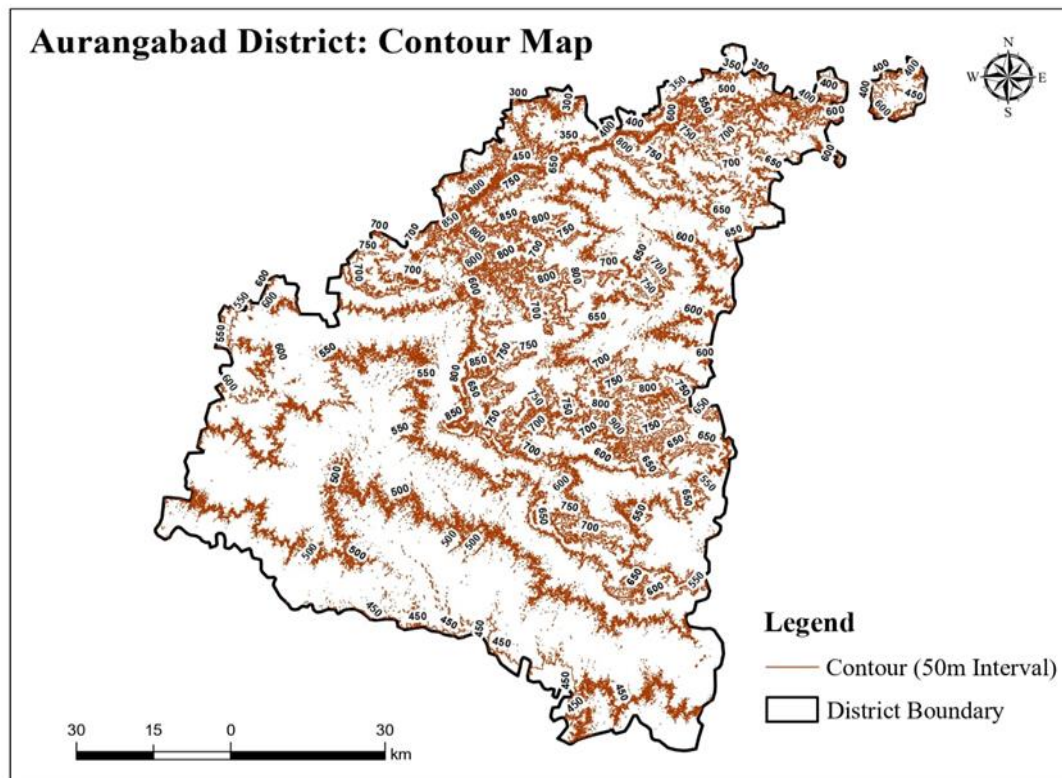
The study area consists of nine tahsils, viz. Aurangabad, Khultabad Kannad, Soygaon, Sillod, Paithan, Gangapur, Vaijapur, and Phulambri.

Map No. 1 - Location Map of Sambhajinagar District**Physiography:**

The district is in the eastern part of Maharashtra. The district may be broadly grouped into two physical regions 1. One of the Godavari basin and 2. The Ajanta plateaus and Ajantha plateaus are divided as I) Ajanta range, II) Sillod plateau, III) Ellora Hills, and IV) Sambhajinagar plateau.

Sambhajinagar district has diversity in the prospective southern part of the district, normally reaching 520 to 575 meters high from sea level, and 580 to 680 meters high in the northern part of the district. The Northern border of the district goes to the Sahyadri branches.

Sahyadri mountain from Maharashtra goes into Satmala and Ajintha ranges, and a subpart of it ranges are known as the hills of Chowka, Satmala Mountain Hills, the mountains of Daulatabad, the hills of Verul (Ellora), and some mountain has peaks with their height from sea level Mhaismal 913 m, Sirsala 840 m, Antar 820 m, Satoda 552, Abbasgad 671 m., and Ajintha 575m, and the famous hill station of Sambhajinagardistrict are Khultabad and Mhaismal. Geographically, Sambhajinagardistrict is divided into the plateau region, the ground, the hills region, and the rivers. All mountains are on average at a height of 600 to 950 m above sea level, and the plateau region is formed by igneous rocks of 460 to 600 m. high above sea level. It has a slope from west to east.



Plane regions of Sambhajinagar district come in the Godavari basin, and the average height of the region is also 440 m above sea level. Some part of Vaijapur, Gangapur, Paithan tahsil is plain, but that of Sillod's Soygaons, Phulambri's, Khultabad's tahsil is hilly, and the remaining part is in the form of plain basins of Godavari, Purna, and Sukhna. Shivana is a fertile river. Godavari has an entrance in the Sambhajinagar district. It is called the southern Ganga, and Sambhajinagar is also called the river's land. This region lies to the west of the Ajantas mountain region and stretches all the way to the south. There are two parts of this region, the Godavari and Shivana valleys, and the second is the Tapi valley.

The Godavari and Shivana valleys lie to the south and west side of the Ajanta region. Kannad tahsil comes in the eastern part, and tahsils such as Gangapur and Vaijapur lie in this region entirely. The second part is the Tapi Valley region. The Tapi valley region lies north of the Ajintha mountain range, and some parts of Soygaon and Kannad tahasil fall within this region.

Influence of Landforms on Agriculture:

The district's agriculture can be divided into two primary zones based on landforms:

River Basins and Plains: The low-mendacity regions along the Godavari and its tributaries have deep, fertile black soils perfect for crops that require rich nutrients and adequate water. Those areas are hubs for high-yield, commercial plants like sugarcane and cotton. The flat terrain additionally permits the smooth use of tractors and other modern-day farm gadgets.

Hilly and Undulating regions: The northern and western components of the district, characterized by rugged terrain, have thin, rocky soils with poor water retention. Right here, agriculture is essentially rain-fed, specializing in hardy, low-enter plants like bajra, jowar, and pulses such as tur and gram. Those crops are nicely suited to dry conditions and require minimal soil preparation.

Influence of Slope:

Slope is an important element influencing both soil and water management.

Mild Slopes and Flatlands: In these areas, water runoff is slight, leading to higher soil moisture retention. This allows farmers to grow crops that require consistent watering and allows for the construction of irrigation channels and bore wells.

Steeper Slopes: On steeper slopes, speedy water runoff causes vast soil erosion, making the land less fertile. Farmers frequently practice contour farming or terracing to mitigate this. The crops grown right here commonly have deep root systems to anchor the soil and are tolerant of drier situations.

Conclusion:

The analysis confirms that landforms and slope are primary drivers of agricultural cropping patterns in Sambhajinagar district. The dichotomy between the fertile, irrigated plains and the rain-fed, drought-inclined hills dictates which plants thrive in each region. To ensure the long-term sustainability of agriculture in the vicinity, destination guidelines should cognizance on promoting water-efficient farming in the plains and inspire the use of soil conservation techniques in hilly areas. This strategic alignment of farming practices with the herbal landscape is critical for environmental resilience and economic stability.

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