Project Report on

"SLOPE PROFILE OF KATRAD GHAT WITH HELP OF DUMPY LEVEL"

Submitted to,

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Submitted By

Mr.KuradeRakesh Bharat

Mr.SayyedJubershahNishar

Mr.PundSubhan Sunil

Mr.Jadhav Krishna Pundlik

Mr.KatoreGorashanath B.

Mr.Bade Prasad Balasaheb

Mr.JareGauravDattatray

UNDER THE GUIDANCE OF

Mr. Auti Sharad Karnasaheb

(M.A. NET, M.B.A)

Assistant Professor of Geography

DEPARTMENT OF GEOGRAPHY

Mula Education Society's,

Arts, Commerce and Science College,

Sonai Tal-Newasa Dist. –Ahmednagar.

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Mula Education Society's

Arts, Commerce and ScienceCollege,

Sonai, Tal – Newasa, Dist. – Ahmednagar

CERTIFICATE

This is to certify that the wor ı the dissertation entitled**"Slope profile of KatradGhat with help of Dumpy level "**

Sumitted by Mr. KuradeRakesh, Mr. SayyedJubershah, Mr. PundSubhanMr.JadhavKrushna,Mr. KatoreGhorashanathMr. PundSuyog Mr. KankPrashad and KarkeSubhamUnder DBT Scheme, Department of Biotechnology, Government of India is carried out under my supervision and guidance at the Department of Geography , Mula Education Society's, Arts, Commerce and Science college, Sonai, Tal- Newasa Dist. Ahmednagar, during the academic year 2020-2021.

Dr. R.V. Wagh.
(Head)
(~~DBT Coordinator~~)

Mr. S. Z. Fakir

Principal
Mula Education Society's
Arts,Commerce & Science College
Sonai, Tal.Newasa, Dist.A'Nagar

Mr. S. K. Auti
(Guide)

nd

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Project Students,

Mr. Kurade Rakesh Bharat

Mr. Sayyed Jubershah Nisar

Mr. Subham Sunil Pund

Mr. Jadhav Krushna Pundlik

Mr. Katore Gorashnath B.

Mr. Pund Suyog Bharat

Mr. Kank Prasad Sanjay

Mr. Subham Ramkisan Karke

Declaration

We hereby declare that the work done in this thesis entitled **"Slope Profile of KaradGhat with the help of Dumpy level "***is submitted to Department of Geography, MES, Arts, Commerce and Science College Sonai. This project is completed under the DBT Star College Scheme and the supervision of Dr. R.V. Wagh The works is original and not submitted in part or full by me or any other to this or any other University.*

Project Students

1. Mr. KuradeRakesh Bharat M.R.Inamdar
2. Mr. SayyedJubershahNisar J.N. Sayyed
3. Mr. Subham Sunil Pund S.S. Pund
4. Mr. JadhavKrushnaPundlik K.P. Jadhav
5. Mr. KatoreGorashanath B.
6. Mr. PundSuyog Bharat Suyog P
7. Mr. Kank Prasad Sanjay
8. Mr. SubhamRamkisanKarke S.R. Karkale

“ Slope Profile of Karad Ghat with help of Dumpy Level ”

INTRODUCTION:

Geomorphology is a branch of the Geography which is related to stud the earth surface phenomena. It study the structure and nature of the earth crust and its related dynamic condition. Geomorphology is the study of landforms, their processes, form and sediments at the surface of the Earth (and sometimes on other planets). Study includes looking at landscapes to work out how the earth surface processes, such as air, water and ice, can mould the landscape. Geomorphology is the scientific study of the origin and evolution of topographic and bathymetric features created by physical, chemical or biological processes operating at or near the Earth's surface. Geomorphologists seek to understand why landscapes look the way they do, to understand landform and terrain history and dynamics and to predict changes through a combination of field observations, physical experiments and numerical modeling. Geomorphologists work within disciplines such as physical geography, geology, geodesy, engineeringGeology, Archaeology, Climatology an d Geotechnical engineering. This broad base of interests contributes to many research styles and interests within the field.Earth's surface is modified by a combination of surface processes that shape landscapes, and geologic processes that cause tectonic uplift and subsidence, and shape the coastal geography. Surface processes comprise the action of water, wind, ice, fire, and life on the surface of the Earth, along with chemical reactions that form soils and alter material properties, the stability and rate of change of topography under the force of gravity, and other factors, such as (in the very recent past) human alteration of the

landscape. Many of these factors are strongly mediated by climate. Geologic processes include the uplift of mountain ranges, the growth of volcanoes, isostatic changes in land surface elevation (sometimes in response to surface processes), and the formation of deep sedimentary basins where the surface of the Earth drops and is filled with material eroded from other parts of the landscape. The Earth's surface and its topography therefore are an intersection of climatic, hydrologic, and biologic action with geologic processes, or alternatively stated, the intersection of the Earth's lithosphere with its hydrosphere, atmosphere, and biosphere.

The broad-scale topographies of the Earth illustrate this intersection of surface and subsurface action. Mountain belts are uplifted due to geologic processes. Denudation of these high uplifted regions produces sediment that is transported and deposited elsewhere within the landscape or off the coast. On progressively smaller scales, similar ideas apply, where individual landforms evolve in response to the balance of additive processes (uplift and deposition) and subtractive processes (subsidence and erosion). Often, these processes directly affect each other: ice sheets, water, and sediment are all loads that change topography through flexural isostasy. Topography can modify the local climate, for example through orographic precipitation, which in turn modifies the topography by changing the hydrologic regime in which it evolves. Many geomorphologists are particularly interested in the potential for feedbacks between climate and tectonics, mediated by geomorphic processes.

In addition to these broad-scale questions, geomorphologists address issues that are more specific and/or more local. Glacial geomorphologists investigate glacial deposits such as moraines, eskers, and proglacial lakes, as well as glacial erosional features, to build chronologies of both small glaciers and large ice sheets and understand their motions and effects upon the

landscape. Fluvial geomorphologists focus on rivers, how they transport sediment, migrate across the landscape, cut into bedrock, respond to environmental and tectonic changes, and interact with humans. Soils geomorphologists investigate soil profiles and chemistry to learn about the history of a particular landscape and understand how climate, biota, and rock interact. Other geomorphologists study how hillslopes form and change. Still others investigate the relationships between ecology and geomorphology. Because geomorphology is defined to comprise everything related to the surface of the Earth and its modification, it is a broad field with many facets.

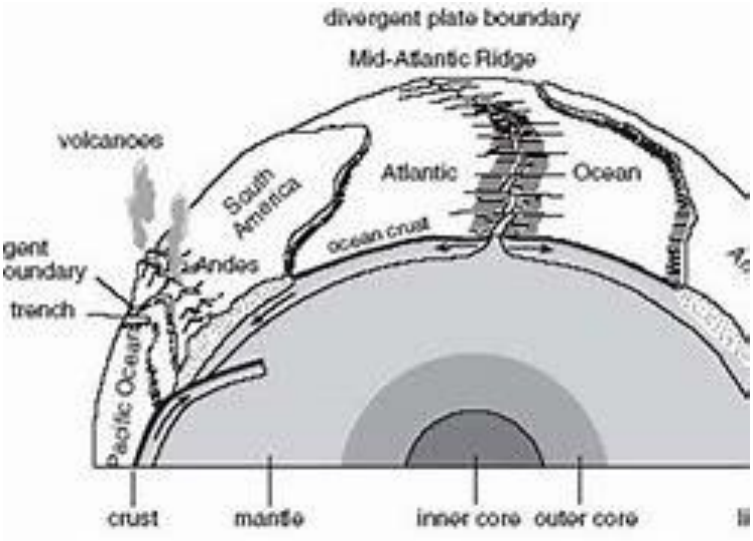
Geomorphologists use a wide range of techniques in their work. These may include fieldwork and field data collection, the interpretation of remotely sensed data, geochemical analyses, and the numerical modeling of the physics of landscapes. Geomorphologists may rely on geochronology, using dating methods to measure the rate of changes to the surface.[4][5] Terrain measurement techniques are vital to quantitatively describe the form of the Earth's surface, and include differential GPS, remotely sensed digital terrain models and laser scanning, to quantify, study, and to generate illustrations and maps.

Practical applications of geomorphology include hazard assessment (such as landslide prediction and mitigation), river control and stream restoration, and coastal protection. Planetary geomorphology studies landforms on other terrestrial planets such as Mars. Indications of effects of wind, fluvial, glacial, mass wasting, meteor impact, tectonics and volcanic processes are studied.[7] This effort not only helps better understand the geologic and atmospheric history of those planets but also extends geomorphological study of the Earth. Planetary geomorphologists often use Earth analogues to aid in their study of surfaces of other planets

EARTH CRUST

Earth's crust is a thin shell on the outside of Earth, accounting for less than 1% of Earth's volume. It is the top component of the lithosphere, a division of Earth's layers that includes the crust and the upper part of the mantle.[1] The lithosphere is broken into tectonic plates whose motion allows heat to escape from the interior of the Earth into space.

The crust lies on top of the mantle, a configuration that is stable because the upper mantle is made of peridotite and so is significantly denser than the crust. The boundary between the crust and mantle is conventionally placed at the Mohorovičić discontinuity, a boundary defined by a contrast in seismic velocity.



The temperature of the crust increases with depth,[2] reaching values typically in the range from about 100 °C (212 °F) to 600 °C (1,112 °F) at the boundary with the underlying mantle. The temperature increases by as much as 30 °C (54 °F) for every kilometer locally in the upper part of the crust

Types of the Landform: A landform is a natural or artificial feature of the solid surface of the Earth or other planetary body. Landforms together make up a given terrain, and their arrangement in the landscape is known as topography. Landforms include hills, mountains, plateaus, canyons, and valleys, as well as shoreline features such as bays, peninsulas, and seas, including submerged features such as mid-ocean ridges, volcanoes, and the great ocean basins. An ocean current flows for great distances and together they create the global conveyor belt, which plays a dominant role in determining the climate of many of Earth's regions. More specifically, ocean currents influence the temperature of the regions through which they travel. For example, warm currents traveling along more temperate coasts increase the temperature of the area by warming the sea breezes that blow over them. Perhaps the most striking example is the Gulf Stream, which makes northwest Europe much more temperate than any other region at the same latitude. Another example is Lima, Peru, where the climate is cooler, being sub-tropical, than the tropical latitudes in which the area is located, due to the effect of the Humboldt Current. Ocean currents are patterns of water movement that influence climate zones and weather patterns around the world. They're primarily driven by winds and by seawater density, although many other factors – including the shape and configuration of the ocean basin they flow through – influence them. The two basic types of currents – surface and deep-water currents – help define the character and flow of ocean waters across the planet.

Mountain: A mountain is an elevated portion of the Earth's crust, generally with steep sides that show significant exposed bedrock. A mountain differs from a plateau in having a limited summit area, and is larger than a hill, typically rising at least 300 metres (1000 feet) above the surrounding land. Weathering is the breaking down of rocks, soils and minerals as well as wood and artificial materials through contact with water, atmospheric gases, and biological organisms.

Weathering occurs *in situ* (on site, with little or no movement), and should not be confused with erosion, which involves the transport of rocks and minerals by agents such as water, ice, snow, wind, waves and gravity.

Weathering processes are divided into *physical* and *chemical weathering*. Physical weathering involves the breakdown of rocks and soils through the mechanical effects of heat, water, ice, or other agents. Chemical weathering involves the chemical reaction of water, atmospheric gases, and biologically produced chemicals with rocks and soils. Water is the principal agent behind both physical and chemical weathering, though atmospheric oxygen and carbon dioxide and the activities of biological organisms are also important. Chemical weathering by biological action is also known as biological weathering.

The materials left over after the rock breaks down combine with organic material to create soil. Many of Earth's landforms and landscapes are the result of weathering processes combined with erosion and re-deposition. Weathering is a crucial part of the rock cycle, and sedimentary rock, formed from the weathering products of older rock, covers 66% of the Earth's continents and much of its ocean floor.

Physical weathering, also called mechanical weathering or *disaggregation*, is the class of processes that causes the disintegration of rocks without chemical change. It is usually much less important than chemical weathering, but can be significant in subarctic or alpine environments. Furthermore, chemical and physical weathering often go hand in hand. For example, cracks extended by physical weathering will increase the surface area exposed to chemical action, thus amplifying the rate of disintegration.[

Frost weathering is the most important form of physical weathering. Next in importance is wedging by plant roots, which sometimes enter cracks in rocks and

pry them apart. The burrowing of worms or other animals may also help disintegrate rock, as can "plucking" by lichens.

Ahmednagar district: Mazalak Ahmed was established in 1494 AD and the capital city of Nizamshah became known as Ahmednagar city by his name. Since Ahmednagar city was headquartered in the district, Ahmednagar was given the name of the district. After the end of Peshwa, Ahmednagar district was formed in 1822. At that time the border of Ahmednagar district was from Wani in present day Nashik district and second end to the district of Solapur in Karmala. Due to the formation of Nashik and Solapur districts in 1869, Wani and Karmala were excluded from Ahmednagar district. The Ahmednagar District of Pune Revenue Division was incorporated in the new revenue department Nashik from February 1981.

In the northern part of the district, plains are found along the banks of the rivers Godavari and Pravara and the southern part, along the rivers Bhima,Ghod and Sina. The different land forms in a region constitute its physical setup. If we consider the physical setup of **Ahmednagar district** we see that there are three physical divisions . 1. Western Hilly Region. 2. Central Plateau Region.Climate in the western region is cold and dry, whereas the eastern areas are hot and dry. The average rainfall of the district is 382 mm. The rainfall distribution is uneven. Godavari and Bhima are the major rivers in the district. Godavari river flows through the northern border of Ahmednagar district.The district is **drained by two chief rivers** ,the **Godavari and the Bhima a tributary of the Krishna.** The Water-shed line is the great spur of the Sahyadries which branches off at

Harichandragad and stretches completely across the district from west to east. **Ahmednagar district**, which is known as 'Rural Development in Co-operation' and 'Land of saints', is situated in the middle of western Maharashtra.**District** has the distinction of being the first in Maharshtra in terms of geographical area.Total geographical area of the **district** is 17048 sq. Km. It is 5.6 percent of the total area of the state.**Geography of Ahmednagar**: **Ahmednagar** a city in the state of Maharashtra, is located on the left banks of Sina River. Ahmedanagar can be divided into three physical divisions as Western Hilly Region, Central Plateau Region and the region of northern and southern plains. Two chief rivers are, the Godavari and the Bhima drain **Ahmednagar**. The important rivers flowing through the **district** are Paravara,

KATAD GHAT AHMEDNAGAR DISTRICT : There are various land forms in Ahmednagar district. There are hilly off-shoots of the Sahyadris in the western part of he district. They are called Kalsubai, Adula, Baleshwar and Harishchandragad hill ranges. Kalsubai, the highest peak in the Sahyadris, lies in Ahmednagar district. Harishchandragad, Ratangad, Kulang and Ajuba are some other peaks in the district. We see the Vita ghat on the way to Randha falls and the Chandanpuri ghat on the Pune-Sangamner road.

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1.physical divisions

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The region of northern and southern plains

Western Hilly Region : Akole taluka and of Sangamner taluka are included in this region. The hill ranges of Adula, Baleshwar and Harishchandragad lie in this region and various high peaks are found in the same region. Kalsubai of height of 5427 feet, the highest peak in the Sahyadris, lies in this Region.

Central Plateau Region : Parner and Ahmednagar talukas and parts of Sangamner, Shrigonde and Karjattalukas are included in this region.

The Region of Northern and Southern plains : This region includes northern Kopargaon, Rahata, Shrirampur, Rahuri, Newasa, Shevgaon and Pathardi talukas This is the region of the Godavari and the pravara river basins. Parts of the southern talukas of Shrigonda, Karjat, jamkhed are also included in this physical division. This region covers basins of the Ghod, Bhima and the Sina rivers.

Ahmednagar district : (Marathi pronunciation is the largest district of Maharashtra state in western India. The historical Ahmednagar city is the headquarters of the district. Ahmednagar was the seat of the Ahmednagar Sultanate of late medieval period (1496–1636 CE). This district is known for the towns of Shirdi associated with Sai Baba, Meherabad associated with Meher Baba, ShaniShinganapur with Shanidev, and Devgad with Lord Dattatreya. Ahmednagar district is part of Nashik Division. The district is bordered by Aurangabad district to the northeast, Nashik district to the northwest, Thane and Pune districts to the southwest, Solapur district to the south and Beed district to the southeast. Ahmednagar and Sangamner are largest cities in the district.

Economic, Historical Cultural Aspects of Ahmednagar District : Although Ahmednagar district was created as early as in 1818, modern history of Ahmednagar may be said to have commenced from 1869, the year in which parts of Nashik and Solapur which till then had comprised Nagar were separated and the present Nagar district was formed. Ahmednagar District was created after the defeat of the Maratha Confederacy in the Third Anglo-Maratha War in 1818, when most of the Peshwa's domains were annexed to British India. The district remained part of the Central division of Bombay Presidency until India's independence in

1947, when it became part of Bombay State, and in 1960 the new state of Maharashtra. In 2006 the Ministry of Panchayati Raj named Ahmednagar one of the country's 250 most backward districts (out of a total of 640). It is one of the twelve districts in Maharashtra currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

Ahmednagar is Maharashtra's most advanced district in many ways. It has the maximum number of sugar factories, perhaps to spread the message of "Rural Prosperity through Cooperation" it gave the country half a century ago. The first cooperative sugar factory in Asia was established at Pravanagar. A role model of water conservation work can be seen at Ralegaon Siddhi, which is also called the Ideal Village. Newase where Dnyaneshwari was written, ShriSaibaba'sShirdi, one of Ashtavinayaks at Siddhatek, the famous Kanifnath temple, attract devotees. The Palace of Chand Bibi, the Bhandardara dam, Harishchandragad Fort, the Maldhok (Indian Bustard) sanctuary and the Rehkuri sanctuary are some of the places of tourist attraction. Islam arrived in Ahmednagar during the Tughlaq dynasty. There are many Muslim monuments like salabat khan's Tomb known as chandbibi, FariaBaug, Ground Fort and many dargas (mosques), and they are found in main town and cities.

Christianity arrived in the 18th century when the British took over the area from the Maratha empire onwards. Christianity has been Ahmednagar's third-largest religion, found all over the district except in the south-west. It is called as Jerusalem of Maharashtra. There is an ancient Hume Memorial Congregational Church in the city, which was built in 1833 by WIDER CHURCH MINISTRIES OF USA later known as American Marathi Mission. In Ahmednagar Christians are a result of the American Marathi mission and the mission of the Church of England's Society for the Propagation of the Gospel. During the British era Ahmednagar was part of Bombay presidency. The first Protestant Christian

mission in the district was opened in 1831. Every village has one or more resident families as Christian and every village has its own church for worship.[15]Ahmednagar's Christians are called Marathi Christians and a majority of them are Protestants. Ahmednagar is district in the Maharashtra state, India. Ahmednagar takes its name from Ahmad Nizam Shah I, who founded the town in 1494.

The **Western Ghats**, is a mountain range that covers an area of 160,000 km^2 (62,000 sq mi) in a stretch of 1,600 km (990 mi) parallel to the western coast of the Indianpeninsula, traversing the states of Karnataka, Goa, Maharashtra, Gujarat, Kerala, and Tamil Nadu.[1] It is a UNESCOWorld Heritage Site and is one of the eight hotspots of biological diversity in the world. It is sometimes called the Great Escarpment of India. It contains a very large proportion of the country's flora and fauna, many of which are only found in India and nowhere else in the world.According to UNESCO, the Western Ghats are older than the Himalayas. They influence Indian monsoon weather patterns by intercepting the rain-laden monsoon winds that sweep in from the south-west during late summer. The range runs north to south along the western edge of the Deccan Plateau, and separates the plateau from a narrow coastal plain, called Konkan, along the Arabian Sea. A total of thirty-nine areas in the Western Ghats, including national parks, wildlife sanctuaries and reserve forests, were designated as world heritage sites in 2012 – twenty in Kerala, ten in Karnataka, six in Tamil Nadu and four in Maharashtra.

The range starts near the Songadh town of Gujarat, south of the Tapti river, and runs approximately 1,600 km (990 mi) through the states of Maharashtra, Karnataka, Goa, Kerala and Tamil Nadu ending at MarunthuvazhMalai, Swamithope near the southern tip of India in Tamil Nadu. These hills cover 160,000 km^2 (62,000 sq mi) and form the catchment area for complex riverine drainage systems that drain almost 40% of India. The Western Ghats block

southwest monsoon winds from reaching the Deccan Plateau. The average elevation is around 1,200 m (3,900 ft).

The area is one of the world's ten "hottest biodiversity hotspots." It has over 7,402 species of flowering plants, 1,814 species of non-flowering plants, 139 mammal species, 508 bird species, 179 amphibian species, 6,000 insects species, and 290 freshwater fish species. It is likely that many undiscovered species live in the Western Ghats. At least 325 globally threatened species occur in the Western Ghats.[9][10][11] The biodiversity found here rivals that of the Amazon Rainforest.

The Western Ghats extend from the Satpura Range in the north, stretching from Gujarat to Tamil Nadu. It traverses south through the states of Maharashtra, Goa, Karnataka and Kerala. Major gaps in the range are the Goa Gap, between the Maharashtra and Karnataka sections, and the Palghat Gap on the Tamil Nadu and Kerala border between the Nilgiri Mountains and the Anaimalai Hills. The mountains intercept the rain-bearing westerly monsoon winds, and are consequently an area of high rainfall, particularly on their western side. The dense forests also contribute to the precipitation of the area by acting as a substrate for condensation of moist rising orographic winds from the sea, and releasing much of the moisture back into the air via transpiration, allowing it to later condense and fall again as rain.

The northern portion of the narrow coastal plain between the Western Ghats and the Arabian Sea is known as the Konkan, the central portion is called Kanara and the southern portion is called Malabar. The foothill region east of the Ghats in Maharashtra is known as Desh, while the eastern foothills of the central Karnataka state is known as Malenadu. The range is known as *Sahyadri* in Maharashtra and Karnataka. The Western Ghats meet the Eastern Ghats at the Nilgiri mountains in northwestern Tamil Nadu. The Nilgiris connect the Biligiriranga Hills in southeastern Karnataka with the Shevaroys and Tirumala hills. South of the

Palghat Gap are the Anamala Hills, located in western Tamil Nadu and Kerala with smaller ranges further south, including the Cardamom Hills, then Aryankavu pass, and Aralvaimozhi pass near Kanyakumari. The range is known as *Sahyan* or *Sahian* in Kerala. In the southern part of the range is Anamudi (2,695 metres (8,842 ft)), the highest peak in the Western Ghats. Ooty is called the Queen of the Western ghats.

Historically the Western Ghats were covered in dense forests that provided wild foods and natural habitats for native tribal people. Its inaccessibility made it difficult for people from the plains to cultivate the land and build settlements. After the establishment of British colonial rule in the region, large swathes of territory were cleared for agricultural plantations and timber. The forest in the Western Ghats has been severely fragmented due to human activities, especially clear-felling for tea, coffee, and teak plantations from 1860 to 1950. Species that are rare, endemic and habitat specialists are more adversely affected and tend to be lost faster than other species. Complex and species rich habitats like the tropical rainforest are much more adversely affected than other habitats.

The area is ecologically sensitive to development and was declared an ecological hotspot in 1988 through the efforts of ecologist Norman Myers. The area covers five percent of India's land; 27% of all species of higher plants in India (4,000 of 15,000 species) are found here and 1,800 of these are endemic to the region. The range is home to at least 84 amphibian species, 16 bird species, seven mammals, and 1,600 flowering plants which are not found elsewhere in the world. The Government of India has established many protected areas including 2 biosphere reserves, 13 national parks to restrict human access, several wildlife sanctuaries to protect specific endangered species and many reserve forests, which are all managed by the forest departments of their respective state to preserve some of the ecoregions still undeveloped. The Nilgiri Biosphere Reserve, comprising 5,500

square kilometres (2,100 sq mi) of the evergreen forests of Nagarahole and deciduous forests of Bandipur in Karnataka, adjoining regions of Wayanad-Mukurthi in Kerala and Mudumalai National Park-Sathyamangalam in Tamil Nadu, forms the largest contiguous protected area in the Western Ghats. Silent Valley in Kerala is among the last tracts of virgin tropical evergreen forest in India.

In August 2011, the Western Ghats Ecology Expert Panel (WGEEP) designated the entire Western Ghats as an Ecologically Sensitive Area (ESA) and assigned three levels of Ecological Sensitivity to its different regions.[The panel, headed by ecologist MadhavGadgil, was appointed by the Union Ministry of Environment and Forests to assess the biodiversity and environmental issues of the Western Ghats. The Gadgil Committee and its successor, the Kasturirangan Committee, recommended suggestions to protect the Western Ghats. The Gadgil report was criticised as being too environment-friendly and the Kasturirangan report was labelled as being anti-environmental.

The Western Ghats are a UNESCO heritage site.

In 2006, India applied to the UNESCOMan and the Biosphere Programme (MAB) for the Western Ghats to be listed as a protected World Heritage Site In 2012, the following places were declared as World Heritage Sites.

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