



# THE LAND OF ENIGMA

**An exploration of Palakkad Gap,  
Western Ghats, India**

**Project Summary**

Submitted by

**Department of Geography, Government College, Chittur**



# Older than the Western Ghats

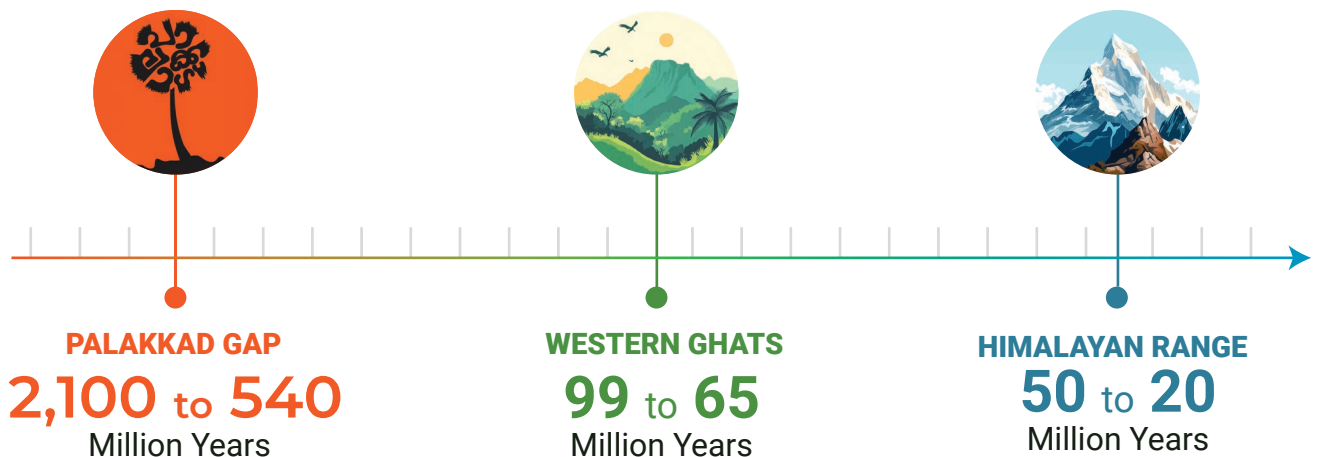


Palakkad Gap was believed to be the low-lying mountain pass in the Western Ghats

Between Coimbatore District of Tamil Nadu and Palakkad District of Kerala

This research has revealed that the Gap is much older than the Western Ghats

## The age of India's landmark landscapes



## India's 35<sup>th</sup> Geo Heritage Site?

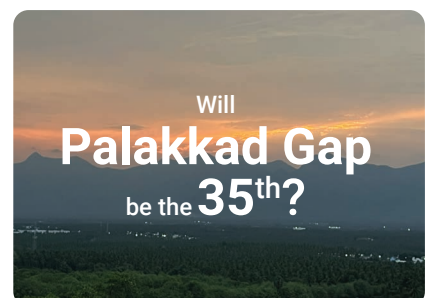
**34 sites** in India are recognized for their geological significance and value in understanding Earth's history



Lonar Lake in Maharashtra



Silathoranam (Natural Arch)  
in Tirumala Hills



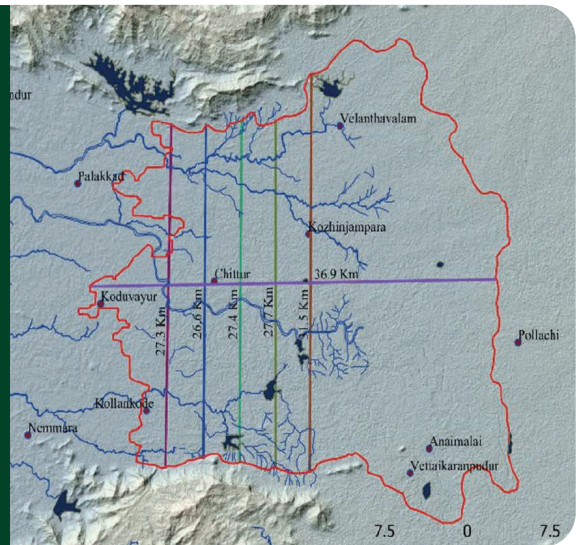
Will  
Palakkad Gap  
be the 35<sup>th</sup>?

# Spread over a much larger space

Believed to stretch over a length of  
**41 kms**  
between Coimbatore and Palakkad

The comprehensive research has now  
delineated the spatial spread to be

**979.81 sq.km.**



Longitude



**76°38'E** to  
**77°00'E**

Latitude



**10°31'N** to  
**10°53'N**

# Equally spread across Kerala and Tamil Nadu



513.44 sq.km.  
**(52.4%)**  
in **Kerala**



466.37 sq.km.  
**(47.6%)**  
in **Tamil Nadu**



# Geological events behind the formation of the Western Ghats



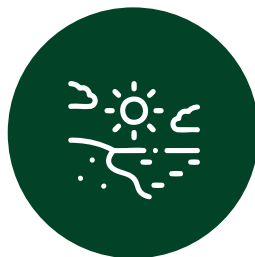
Rifting



Slope  
Recession



Volcanic  
Eruption



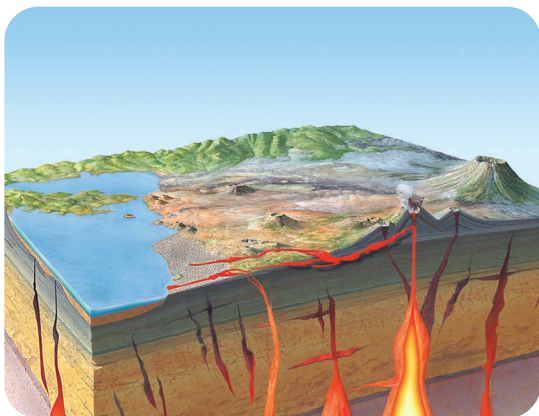
Landward Retreat  
of Coastline



Erosion



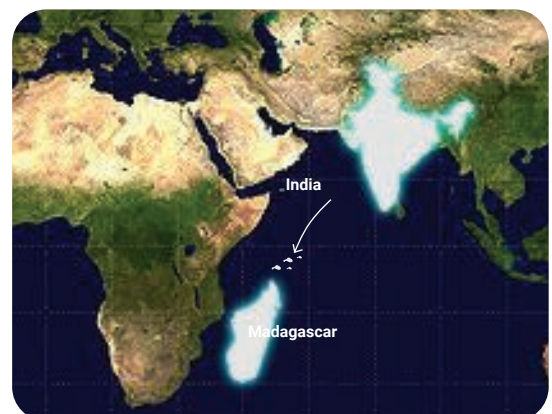
Rising or Sinking of  
the Earth in response  
to topographic load



**Hot molten magma rose** from the Earth's interior near present-day Reunion Islands

**66 million years** ago

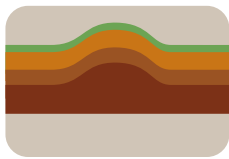
This led to the **separation of Seychelles** - an island group Northeast of **Madagascar** - from India



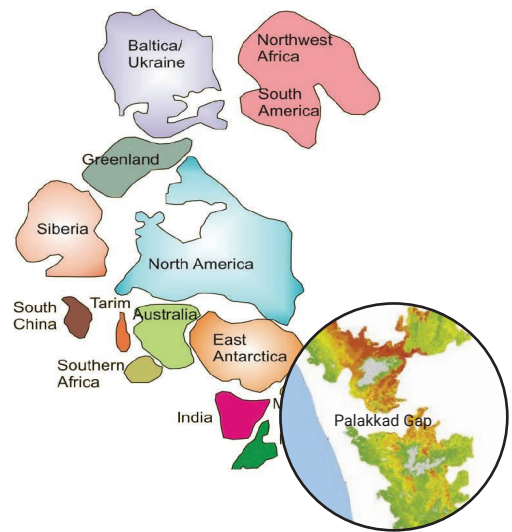
# Geological History & formation of Palakkad Gap

Amalgamated during the episodic cycles of continent assemblies between

## 2500 – 1600 Million years ago



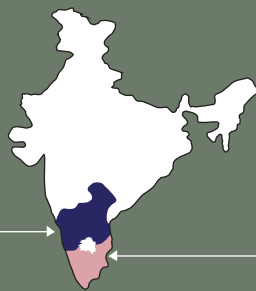
Formation occurred along a linear belt of intense deformation where different land masses with distinct characteristics join (suture zone)



These distinct land masses were:



The **Dharwar Craton**  
(Karnataka Plateau)  
to the North



The **Southern Granulite Terrain**  
(in Kerala and Tamil Nadu)  
to the South

## Rocks in the Palakkad Gap

Underwent changes due to



High Temperatures

**760 - 800°C**



High Pressure

**7.1 - 8.4 k bar**



Last Crystallization  
happened around

**777 ± 18  
million years ago**

# Tracing the geological bond between India and Madagascar



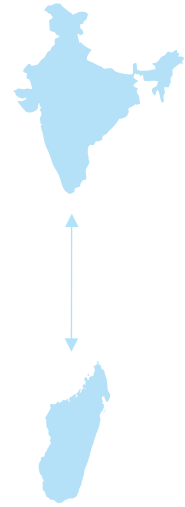
India-Madagascar connections were established by correlating the rocks within the intracontinental shear zones where rocks are highly strained



The continuation of the Palghat Cauvery Shear Zone can be seen in the form of Betsimisaraka continental collision zone of eastern Madagascar



Geochemistry and petrography of the Palakkad Gap rocks reveal that they formed as Mozambique Ocean closed and **the Gondwana supercontinent formed 2,100 to 540 million years ago**



Home to  
'Earth Heritage Rock'

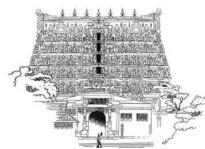
**Charnockite Rocks**  
one of the earliest known rock formations

Recognized as Earth Heritage Rock by the International Union of Geological Sciences

Holds significant historical and architectural value - extensively used in iconic monuments:



Mahabalipuram Temple



Sri Padmanabha Temple



Thiruvalluvar Memorial



Christ the Redeemer Statue, Brazil

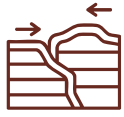


Oscar Wilde Statue, Dublin

“**The rocks and forest know it real**”  
- Ralph Waldo Emerson

# A micro-geomorphological marvel

This distinct small-scale landform was shaped by the interplay of geology, climate, and tectonic activity over time



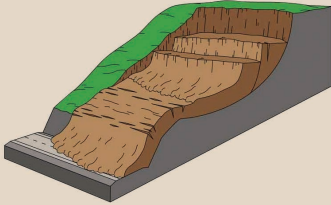
**Tectonic Forces**



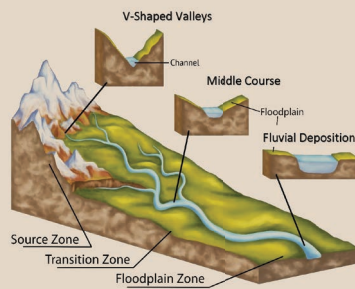
**Erosional Processes**



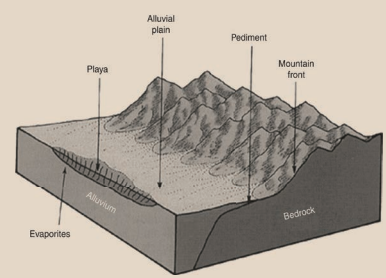
**Climatic Influences**



The Gap is dominated by **Denudational landforms** with reduced elevation due to weathering and erosion, and **Pediplains** - extensive plain formed by the joining of pediments



**Fluvial processes** (erosion and deposition by water) contribute to valley fills and floodplains



Influence of **folds, faults, and rock layers** influence drainage systems and water resource distribution

Oldest & one of the richest soils in the world



Presence of Gibbsite mineral suggests that the soil is quite old with highest micro-nutrients

## Soil depth is high compared to the rest of India

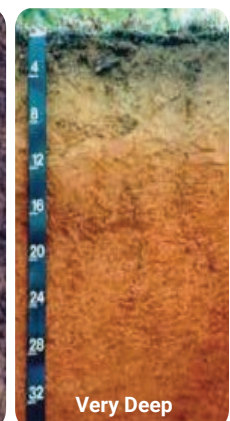
Except for the alluvial soils of the North Indian plains, the black soils of Deccan plateau, and the Kari soils of Kuttanad

**37.94%**

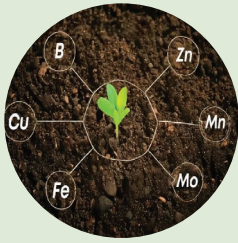
**44,256 Ha**  
Moderately Deep to Deep Soils

**56.28%**

**65,674 Ha**  
Deep to Very Deep Soils



# Outstanding soil nutrient status



“THE BEST” soil with micronutrient potential deposits in Kerala and Tamil Nadu



Possess abundant macro and micronutrients



Ideal for agriculture, compelling for further research on its uniqueness

# Floristic diversity of the world



The Palakkad Gap region is highly diverse in terms of flora

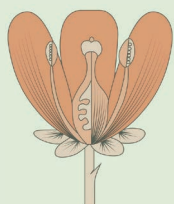
Harbours many rare and endemic species

## Home to Endemic Species

Presence of endemic species like

***Pandanus palakkadensis***

says a lot about the Gap



**170** Angiosperms Species

belonging to 44 families and 101 genera

Seasonal vegetation in the hillocks

**89 plants** belonging to **39 families** and

**68 genera**

**07** Pteridophytes Species

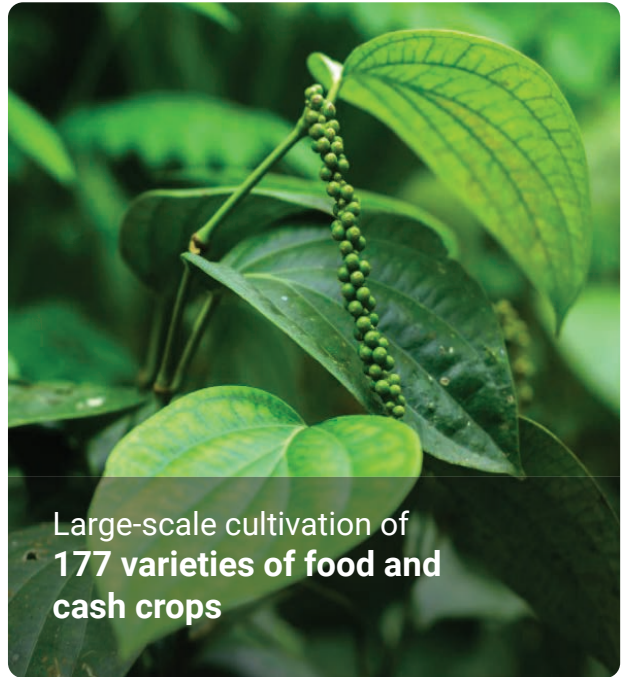
belonging to 6 families



# A goldmine for crop diversity



Soil and micro-climate is suitable for **high-value agro produce** than paddy



Large-scale cultivation of **177 varieties of food and cash crops**



**Eruthempathy** leads the region with the **highest crop richness**



**Vadakarapathy** shows **high agro biodiversity** in the Gap

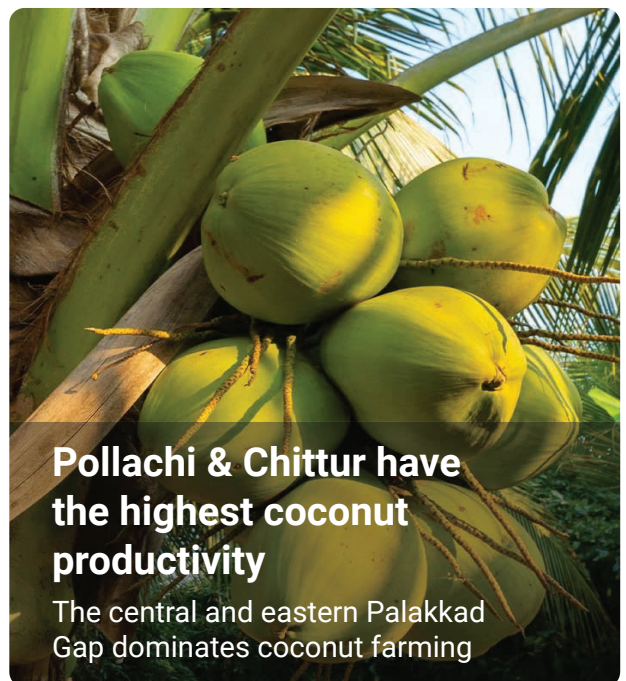


The fertile soil and unique micro-climate supports **136 weed species** belonging to **107 genera** and **40 families**



**Muthalamada is the new Mango Capital**

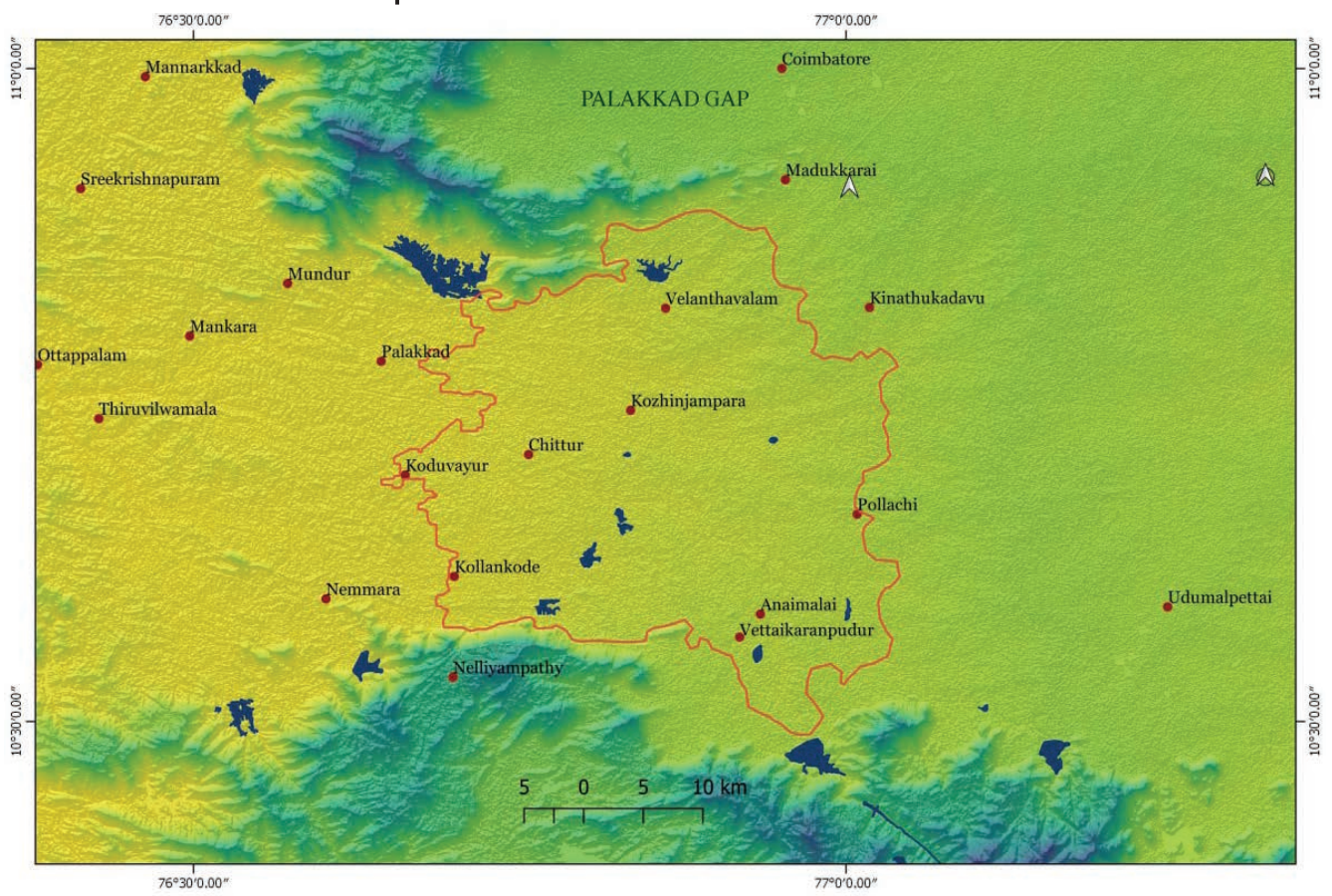
The southern part of Palakkad Gap is fast emerging as the Alphonso / Mango capital

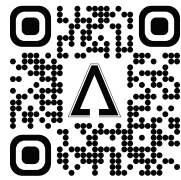


**Pollachi & Chittur have the highest coconut productivity**

The central and eastern Palakkad Gap dominates coconut farming

# Palakkad Gap





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