

# TYPES OF AQUIFER



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# Relation between aquifer and groundwater

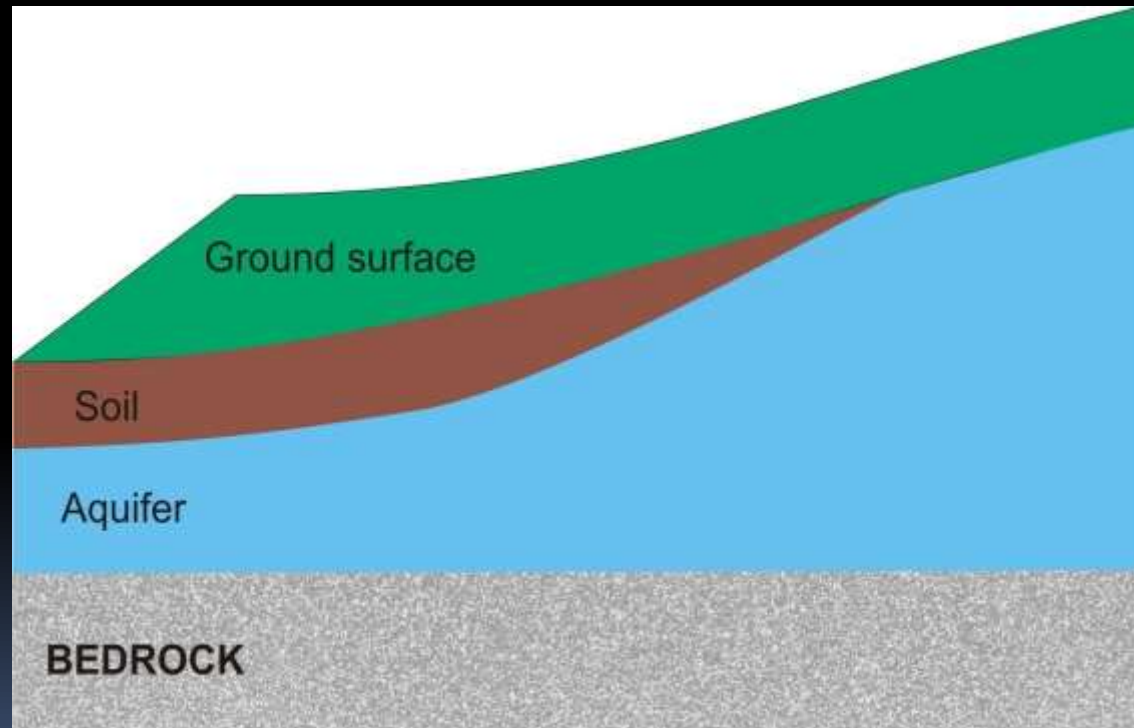




# Aquifers

AQUIFER (In Greek) = AQUA (water) + FERRE (to bear)

- In simple terms an aquifer is simply a water bearing rock formation.
- Underground storage reservoirs is another way of referring to aquifers.
- An *aquifer* must possess enough porosity to get saturated and must also be able to release this stored water to wells and springs which can then serve as good sources of water supply.



# Types of Aquifer

## Unconfined aquifer

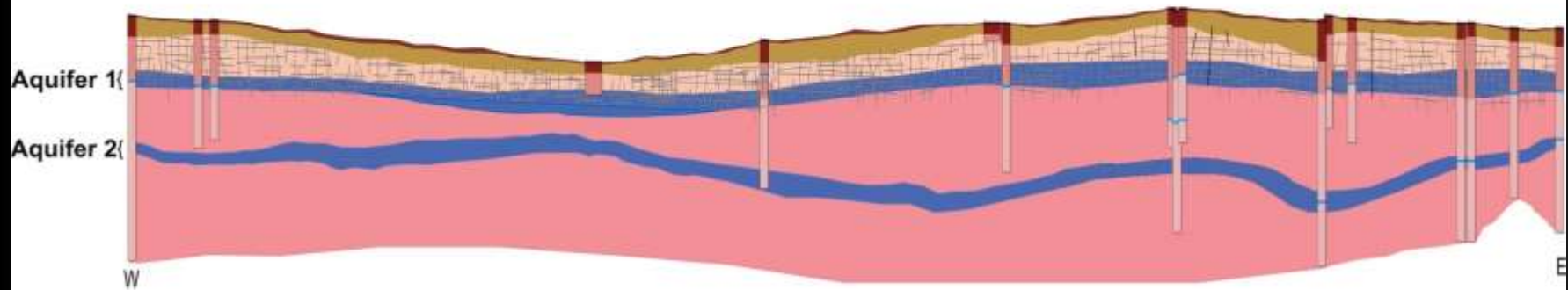
Where groundwater is in direct contact with the atmosphere through the open pore spaces of the overlying soil or rock, then the aquifer is said to be unconfined. The upper groundwater surface in an unconfined aquifer is called the water table.








## Confined aquifer

A confined aquifer is an aquifer bounded both at the bottom and at the top by an impermeable stratum and fully filled with water which is usually under pressure. When perforating a hole into the ground until reaching the confined aquifer, one will see the water level in the hole rise to above the top of the aquifer and perhaps even above the land surface.

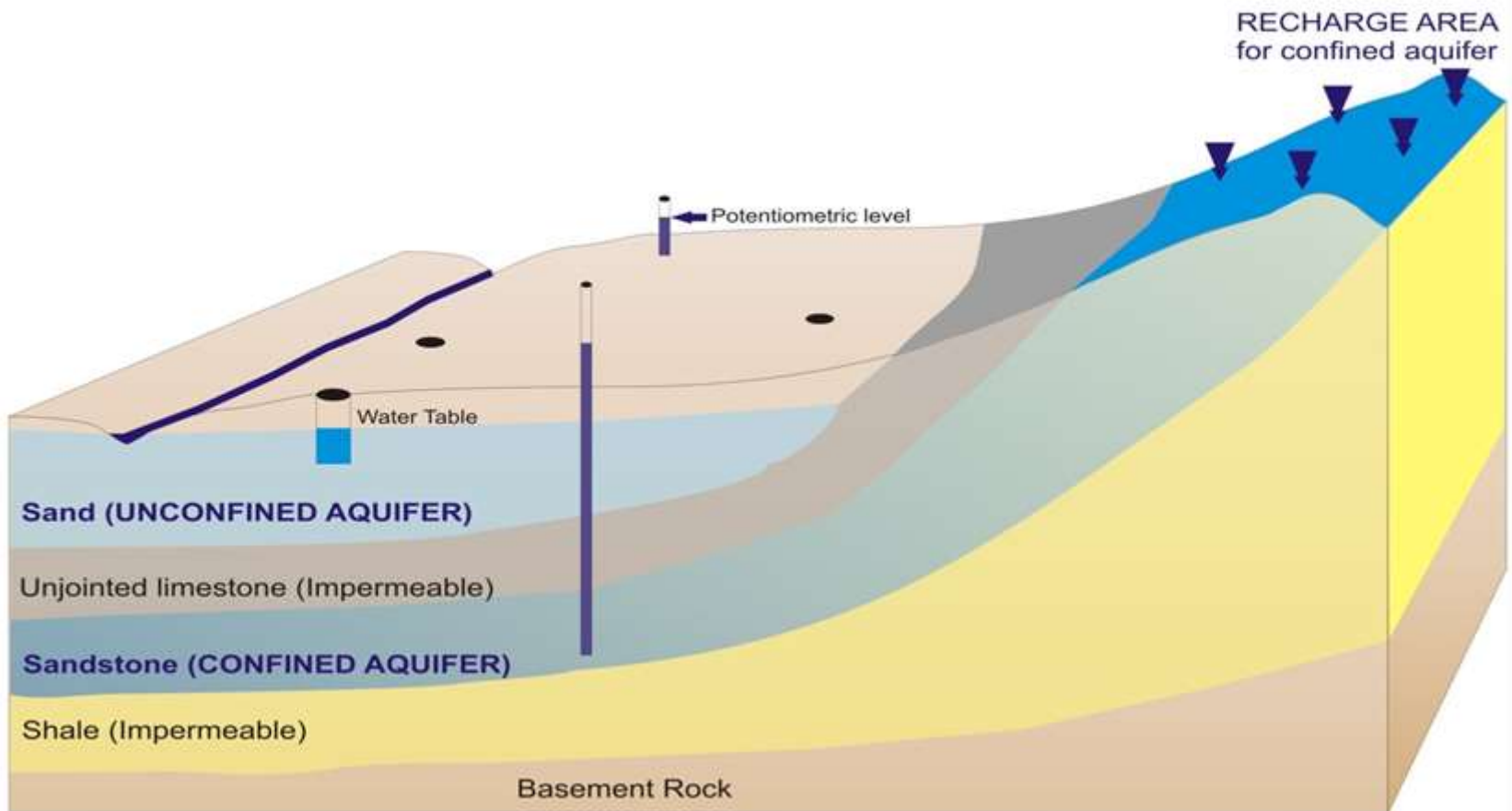
# West - East cross section of Study Area



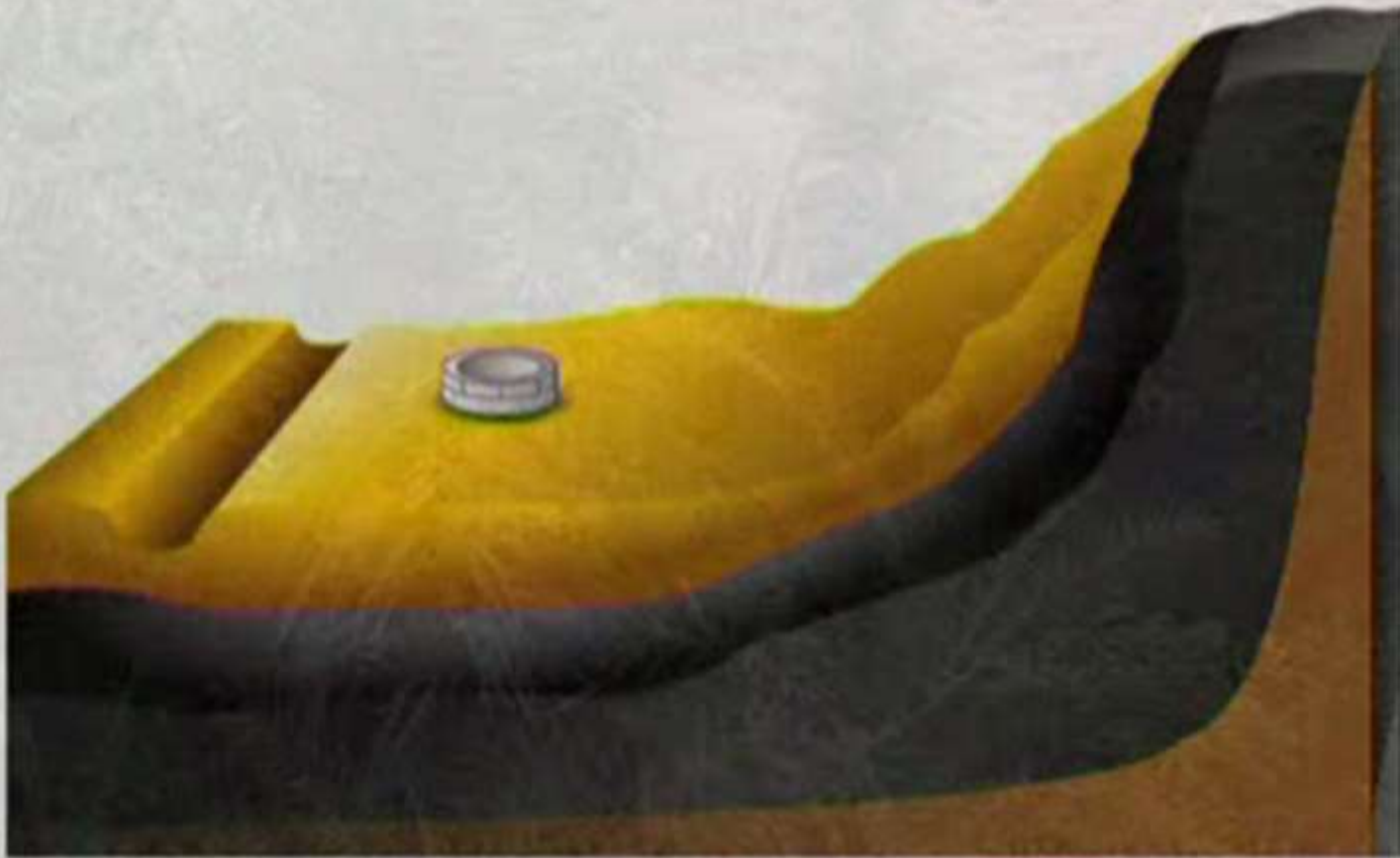
	Soil
	Weathered zone
	Fractured granite
	Granite
	Aquifers

scale: x axis 1:8529  
y axis 1:2348.9

# Unconfined and confined aquifers



# Recharge to Unconfined & Confined aquifers



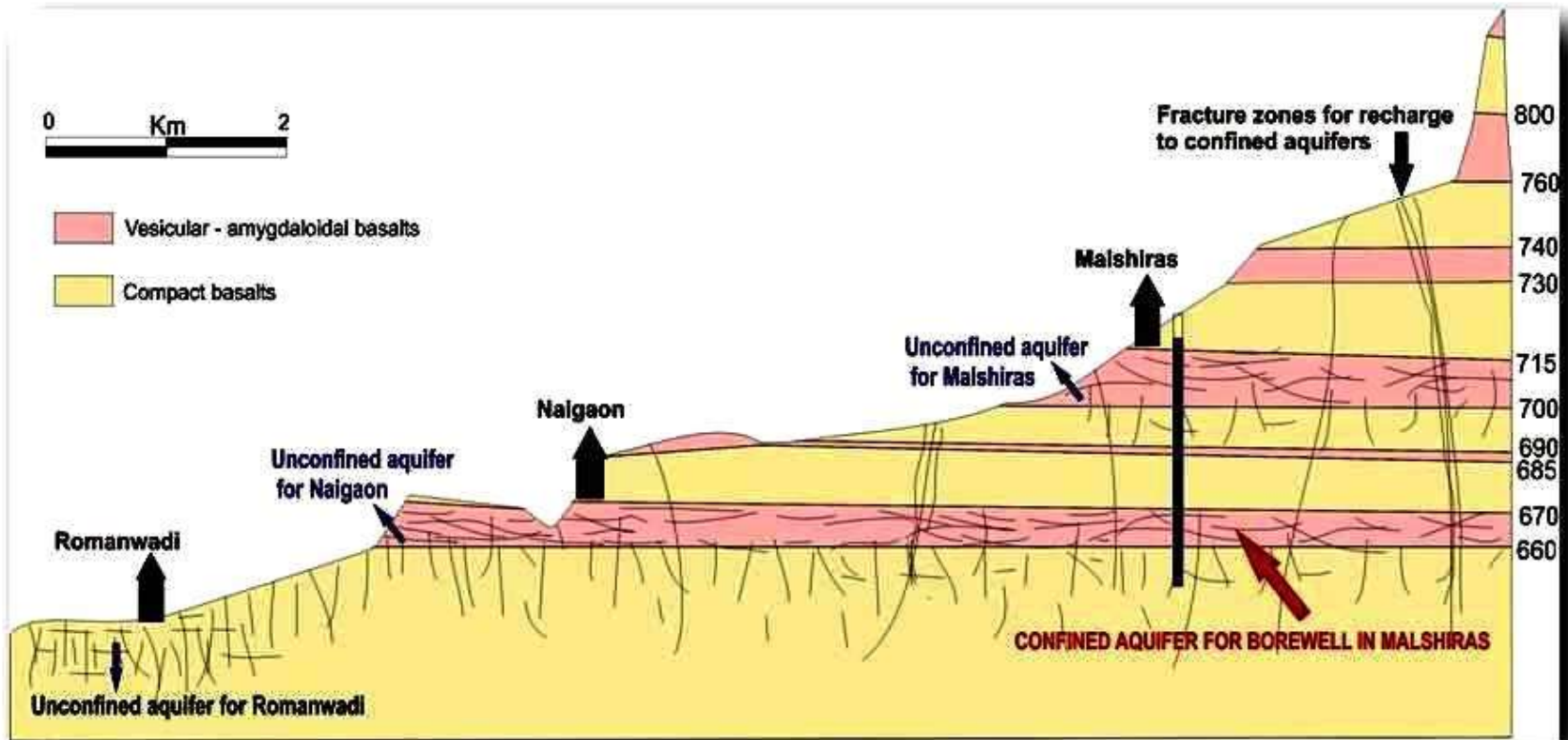


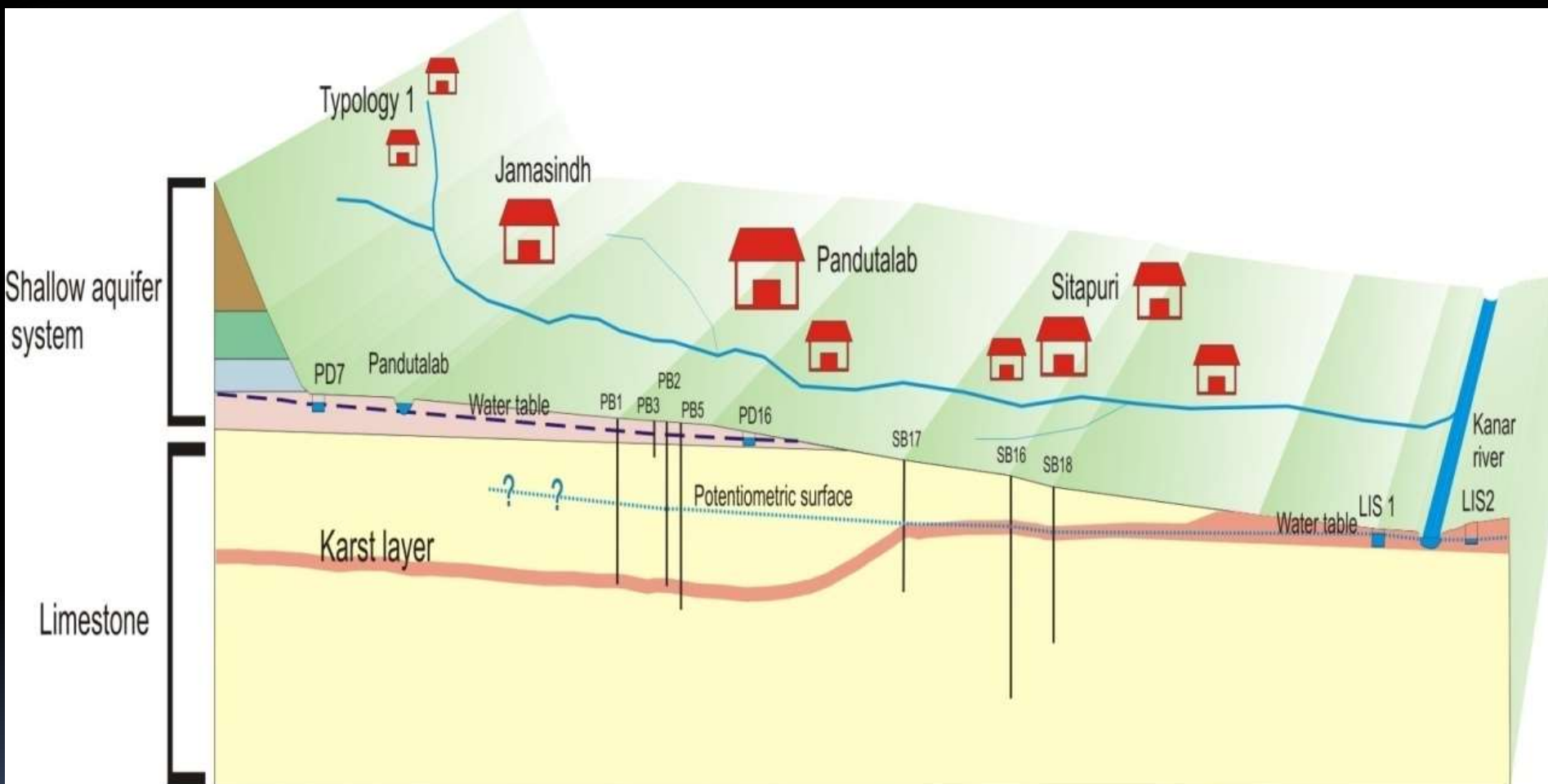
# Fracture zones and dykes (if permeable) act as zones of recharge to confined aquifers





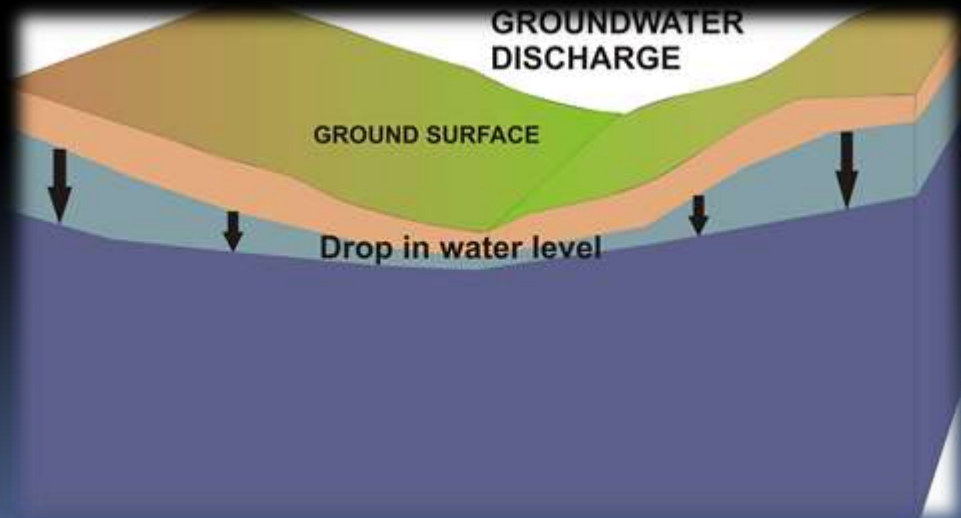
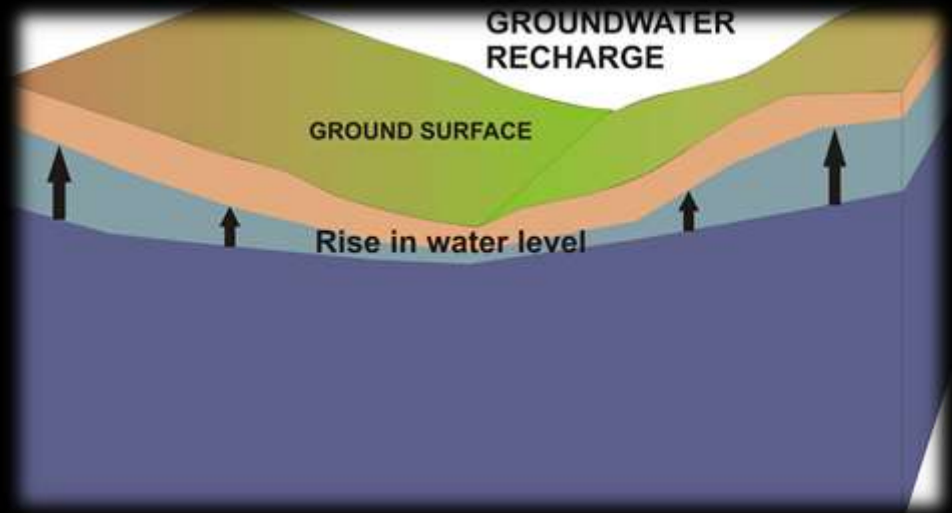
# The same layer of rock can act as unconfined and confined aquifers for wells in different locations





# Something more about an unconfined aquifer

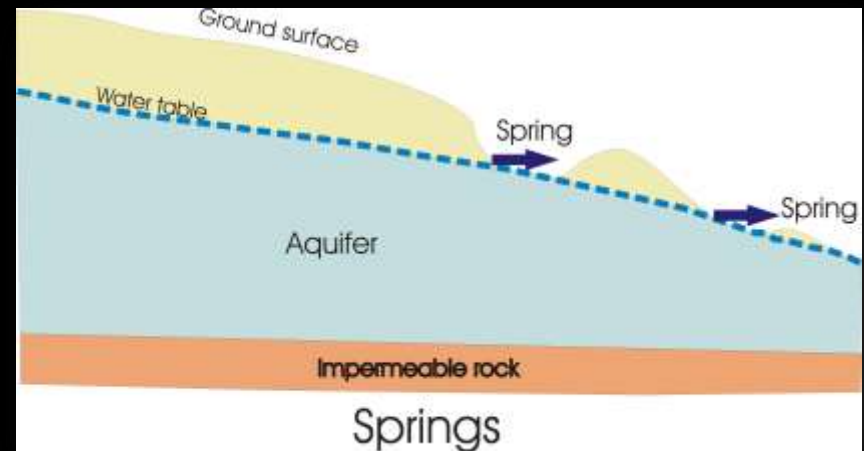
- ▣ The water table fluctuates – it rises and falls...
- ▣ This rise and fall of the water table is related to the changes in the storage of the aquifer.
  - ▣ The rise in water table indicates that water is added to the aquifer – RECHARGE
  - ▣ The fall in water table indicates that water is removed from the aquifer – DISCHARGE





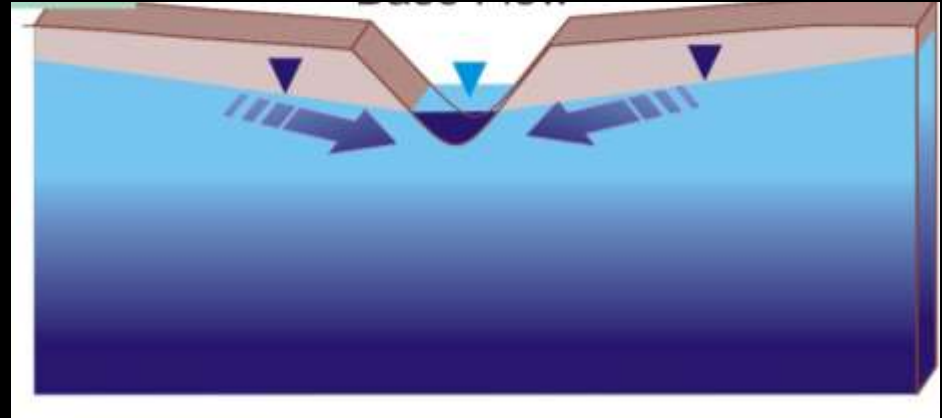
# Relationship between an unconfined aquifer and the ground surface

- Sometimes the water will flow from an unconfined aquifer on to the surface.
- This happens wherever and whenever the water table intersects the ground surface at some points.
- Water begins to flow out on to the surface at such points...as slow seepages or as SPRINGS.
- In reality, the portion of the aquifer below the water table gets connected with the ground surface through openings like intergranular pores, fractures, or joints.



# Base flow

- The contribution of groundwater to the ground surface through *springs and seepages*, which then flows as surface flow is called BASE FLOW.
- Base flow contributes significantly to the *surface runoff* in a stream or river.
- Streams, in many parts of India, continue to flow during the dry season due to base flow contributions.
- Surface runoff, however, may also include other components such as *pure runoff generated by rain, snow melt, releases from reservoirs upstream etc.*



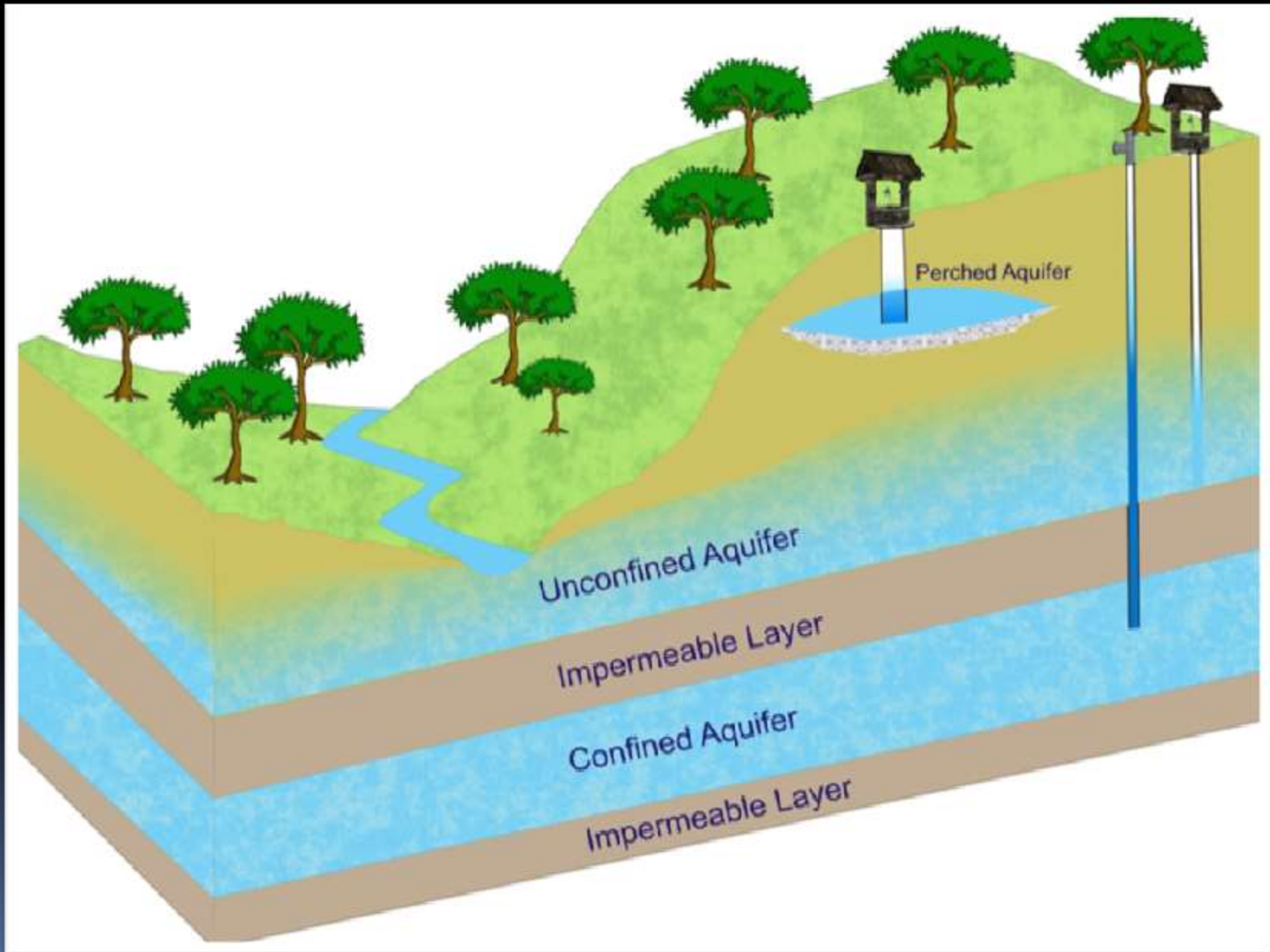


# Base flows can contribute significantly to stream and river flows





# Perched aquifer



# A little more about perched aquifers

- ▣ These are of very limited extent. In other words these are very small aquifers.
- ▣ This is a special case (very small) of unconfined aquifers.
- ▣ Their extent is roughly equal to the dimensions of the impermeable layer underneath.
- ▣ Perched aquifers hold a limited amount of groundwater and possess all the qualities of a conventional unconfined aquifer.



*THANK YOU*

