

# Kachchh Tour

With B. Tech-Civil Geoscience Students

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*R. V. Karanth*

# Geological Tour To Kachchh

Kachchh District in Gujarat State covers a vast area stretching for 300km E-W and 180km N-S with a sparse population.

Being a semiarid region surrounded by salty dry and wet land water management gains a significant importance.

As seismically Kachchh district is a very active zone in the Indian subcontinent geological studies have greater implication.

Geologically it comprises of Mesozoic and Cenozoic sedimentary sequence with some Deccan Traps and associated intrusives.

Older basement rocks are not exposed at any part of the district.

On account of the tectonic activities the province is dissected by several regional faults by thrusting the land into hill ranges over-riding low-lying plains.

-RVK

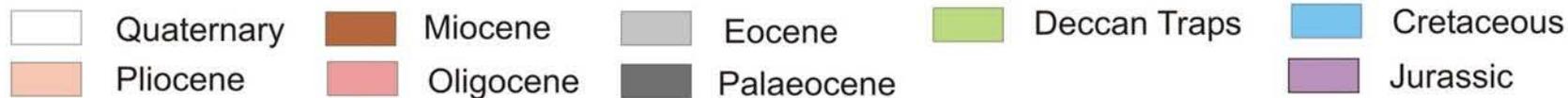
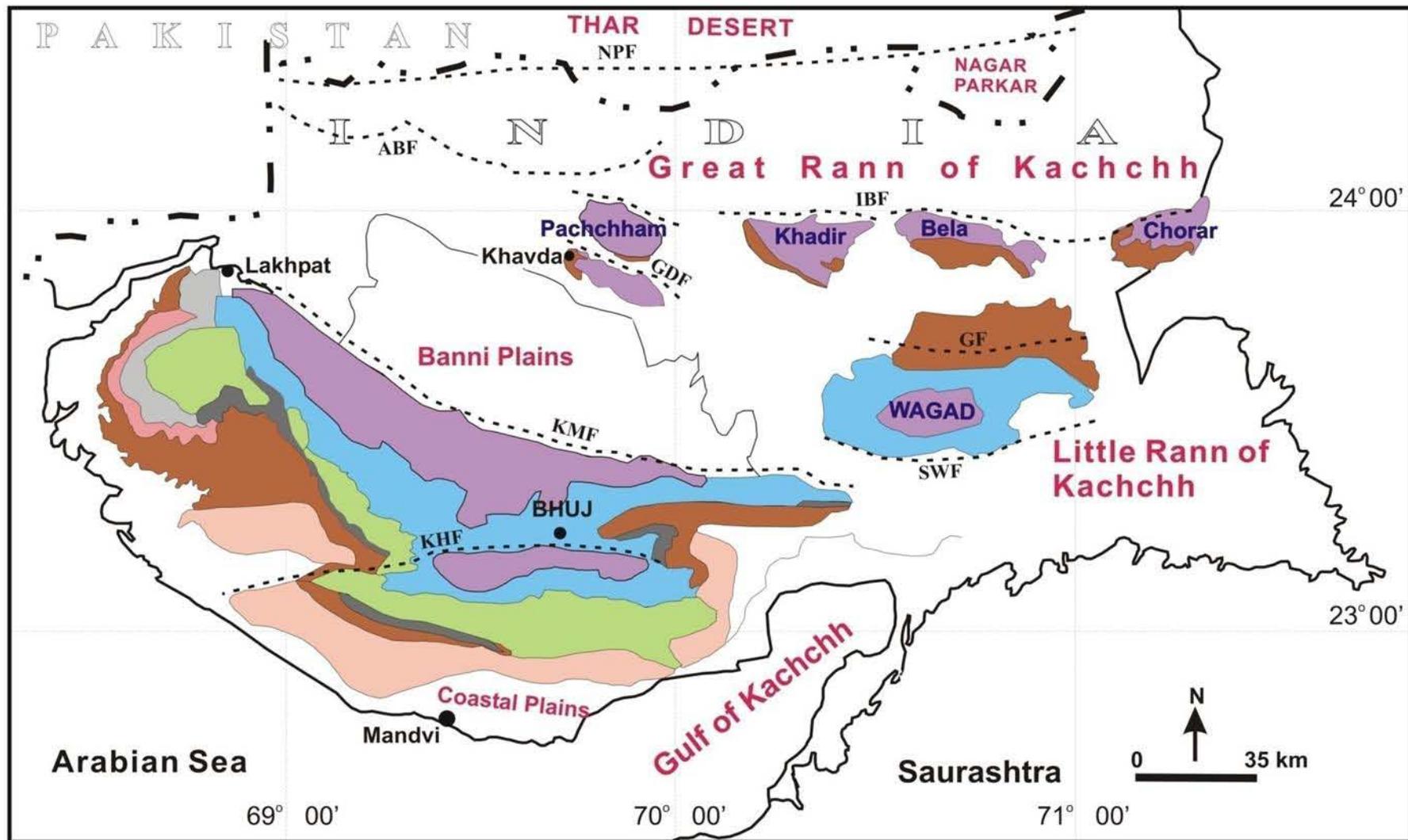
## **Regional Faults and Earthquakes in Kachchh**

Stresses generated on account of the movement of tectonic plates, such as northerly movement of 'Indian Plate' are accumulated in various parts of the Indian subcontinent such as Kachchh District. When the stresses exceed the elastic limit of rock-mass, the crust ruptures creating large scale 'faults' which in turn result in violent earthquakes. In the region of Kachchh the 'Katrol Hill ranges' as well as 'Kachchh Mainland Hill ranges' have progressively risen up from the 'Bhuj Plains' and 'Banni Plains' along 'Katrol Hill Fault' and 'Kachchh Mainland Fault' respectively resulting in innumerable devastating earthquakes in the past.

Two such devastating earthquakes in the living memory are 'Anjar Earthquake' (M6.1), 21 July 1956 killing around 115 people and the 'Bhuj Earthquake' (M7.7), 26 January 2001 leaving 12,300 Dead in Kachchh District alone.

Earthquake of even greater magnitude had struck Kachchh two centuries ago; 1819 Rann of Kachchh Earthquake' (M7.7 to 8.2) which threw the northern part of Kachchh by 6m high ridge for a stretch of over 1000km along a fault termed as 'Allah Bund' and created the vast 'Sindri Lake' and caused 1,543 deaths.

- RVK



**Plate 2:** Geological map of Kachchh (modified after Biswas and Deshpande, 1970). NPF- Nagar Parkar Fault; ABF- Allah Bund Fault; IBF- Island Belt Fault; KMF- Kachchh Mainland Fault; KHF- Katrol Hill Fault; SWF- South Wagad Fault; GF- Gedi Fault; GDF- Goradongar Fault

Karanth and Gadhavi, 2007



**Fig. 1.2:** Physiographic map of Kachchh

- (1) Area inundated by water during rainy season;
- (2) Area remaining dry throughout the year;
- (3) Hill ranges and highlands

## Hill-Range Along Katrol-Hill Fault



Katrol Hill has risen up abutting the Bhuj Plains on account of the northerly movement of Indian Plate. Anjar, the town that was devastated by the earthquake of 1956, is located at the eastern part of the Katrol Hill range.

**Kas Hills – Between Jawaharnagar and Lodai**



## **Hill-Ranges Along Kachchh Mainland Fault**

**Habo Hills – Between Lodai and Kotai**



**RVK**

Hill Ranges Along Island Belt Fault  
Surrounded By 'White Rann' which  
Transforms to 'Wet Rann' in Rainy Days  
['Neither A Sea Nor A Land' type terrain]

RVK



Narrow and deep gorges carved by streams in Kachchh indicate the role of Neotectonic activities. As the region is rapidly rising on account of compressive forces the streams are swiftly incising the rock mass without having much time to spread laterally.



RVK-MSG\_2005



Narrow and Deep Gorge Along Khari River  
Indicates Neotectonic Movements in Kachchh

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# Narrow Gorge Along Khari River (in 2005)



RVK\_05\_11\_2\_P1020811

# Narrow Gorge Along Khari River (in 2015)



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# Minor Faults Genetically Related to Major Faults

## Normal Fault-1, Kodki – Bhuj Road



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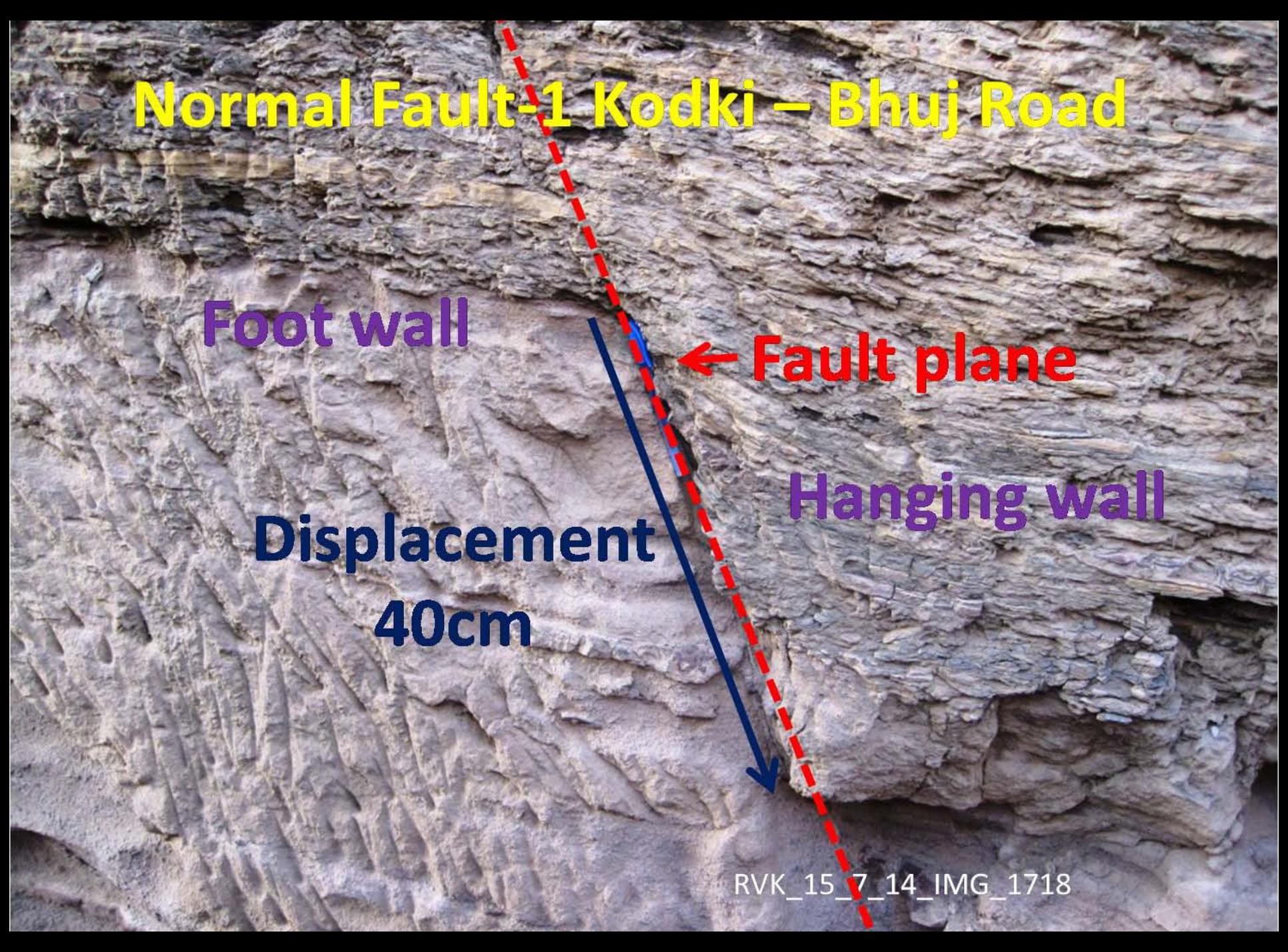
# Normal Fault-1 Kodki – Bhuj Road

Foot wall

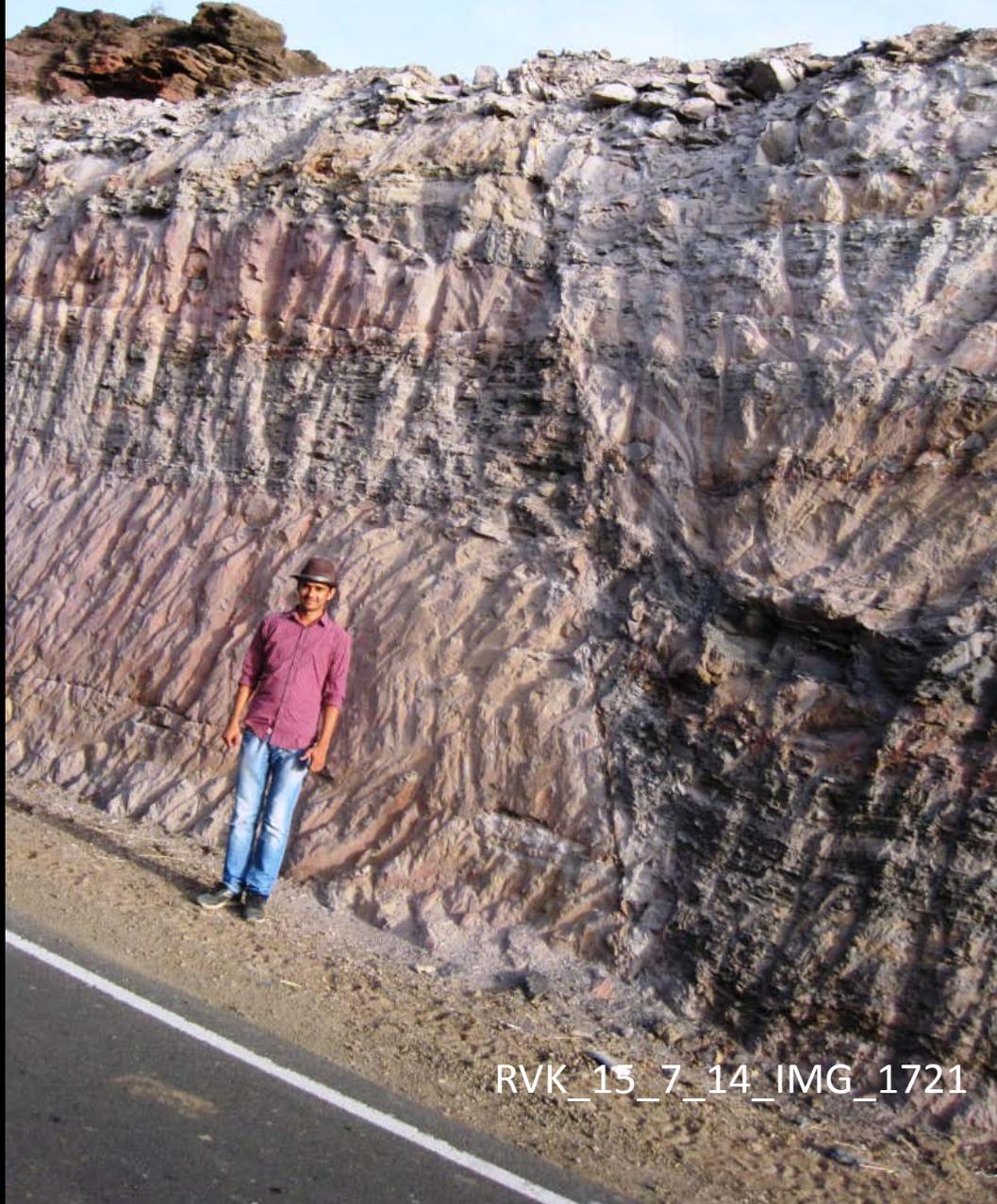
← Fault plane

Hanging wall

Displacement  
40cm

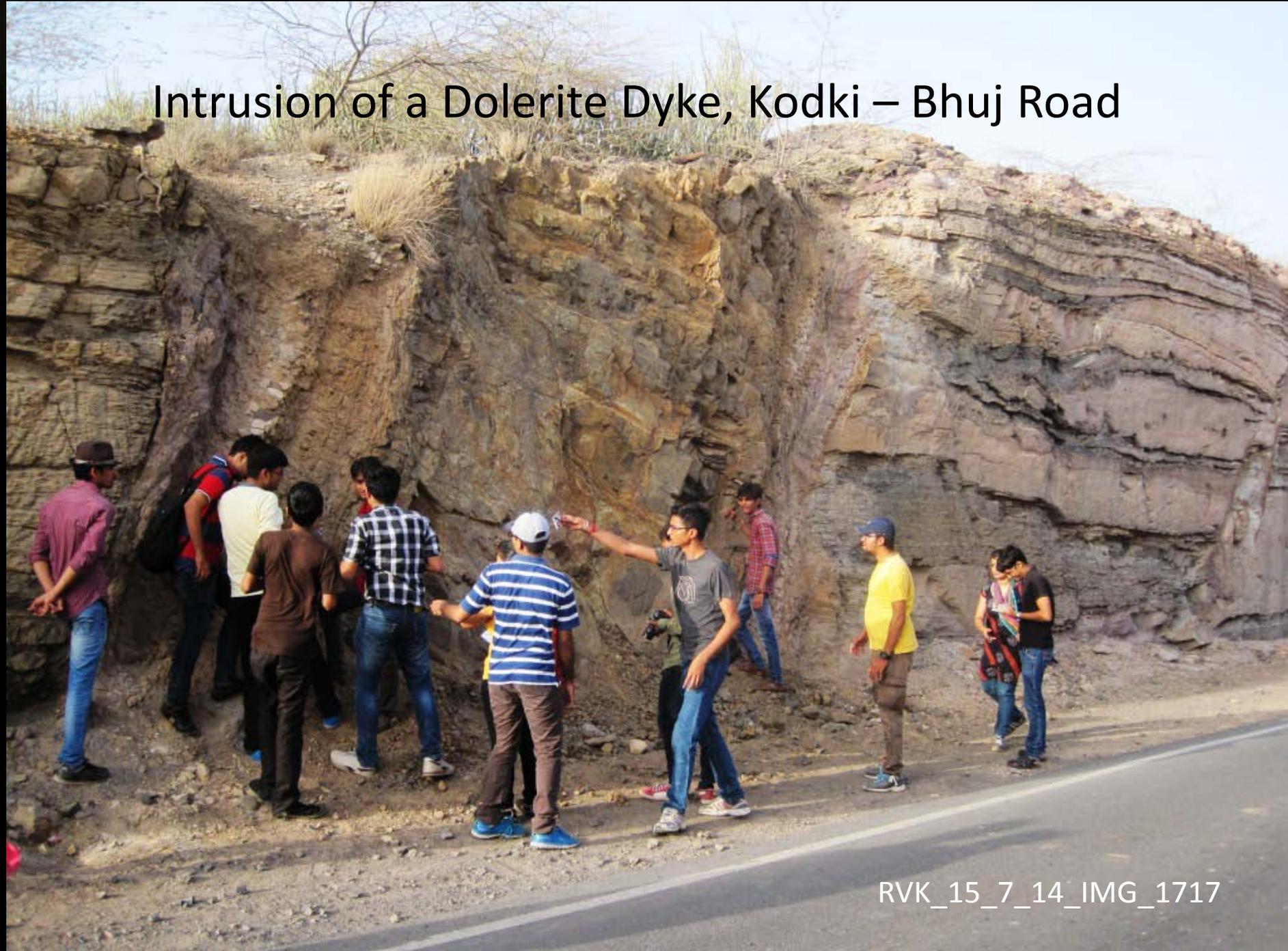


# Normal Fault-3, Kodki – Bhuj Road



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# Intrusion of a Dolerite Dyke, Kodki – Bhuj Road



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# Weathering in Dolerite Dyke



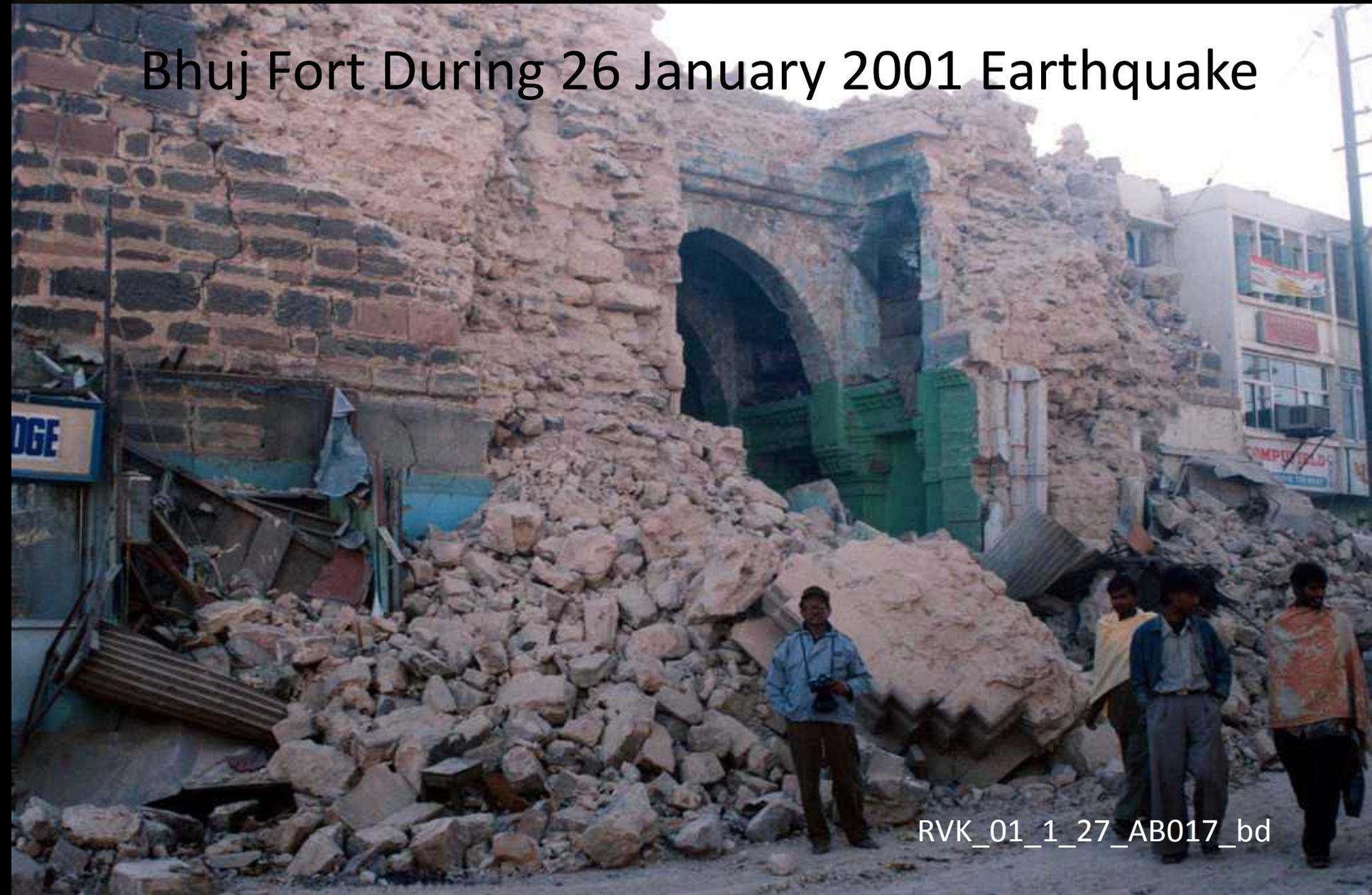
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# A Bird's Nest, Kodki Road



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# Bhuj Fort During 26 January 2001 Earthquake



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# Bhuj Fort After Restoration



RVK\_15\_7\_14\_IMG\_1730

# Destruction in Kachchh

## 26 January 2001 Earthquake



RVK\_01\_1\_27\_5AD020\_d

# Jawaharnagar During 26 January 2001 Earthquake



RVK\_01\_1\_27\_7AE001\_d

With the Villager from Jawaharnagar,  
Who had Experienced the Horrors of 2001 Earthquake



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# Sun Temple, Kotai along Kachchh Mainland Fault



RVK\_15\_7\_15\_IMG\_1748

Weathered-out Intricate Carving,  
Sun Temple, Kotai



RVK\_15\_7\_15\_IMG\_1759

# “Hanging Valley”

A palaeo-channel filled with sediments is exposed  
on account of subsequent erosion  
Khari River gorge, near Bhuj

RVK\_15\_7\_15\_IMG\_1800



A closer look at the “Hanging Valley”

RVK\_15\_7\_15\_IMG\_1805

# Mining for lignite near Mata-no-Madh



RVK\_15\_7\_16\_IMG\_1816

# The Ghost Town of Lakhpat



RVK\_15\_7\_16\_IMG\_1827

# The Rocks Around Lakhpat “Coquina” – Nummulitic Limestone



RVK\_15\_7\_16\_IMG\_1829

# 'Headward Erosion' Along a Stream in Lakhpat's Nummulitic Terrain



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# The Great Rann of Kachchh

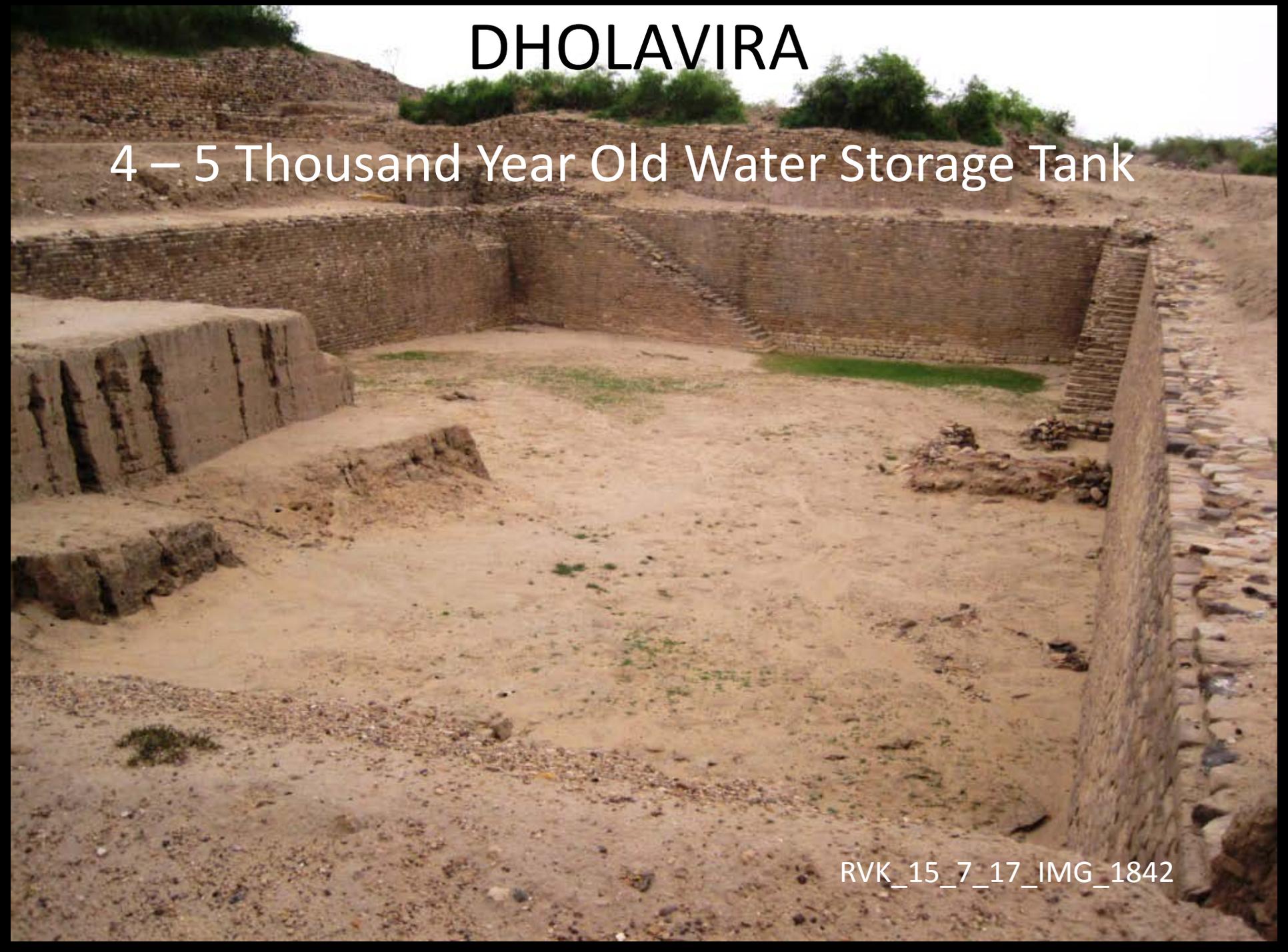
## The 'White Rann'

On the way to Dholavira

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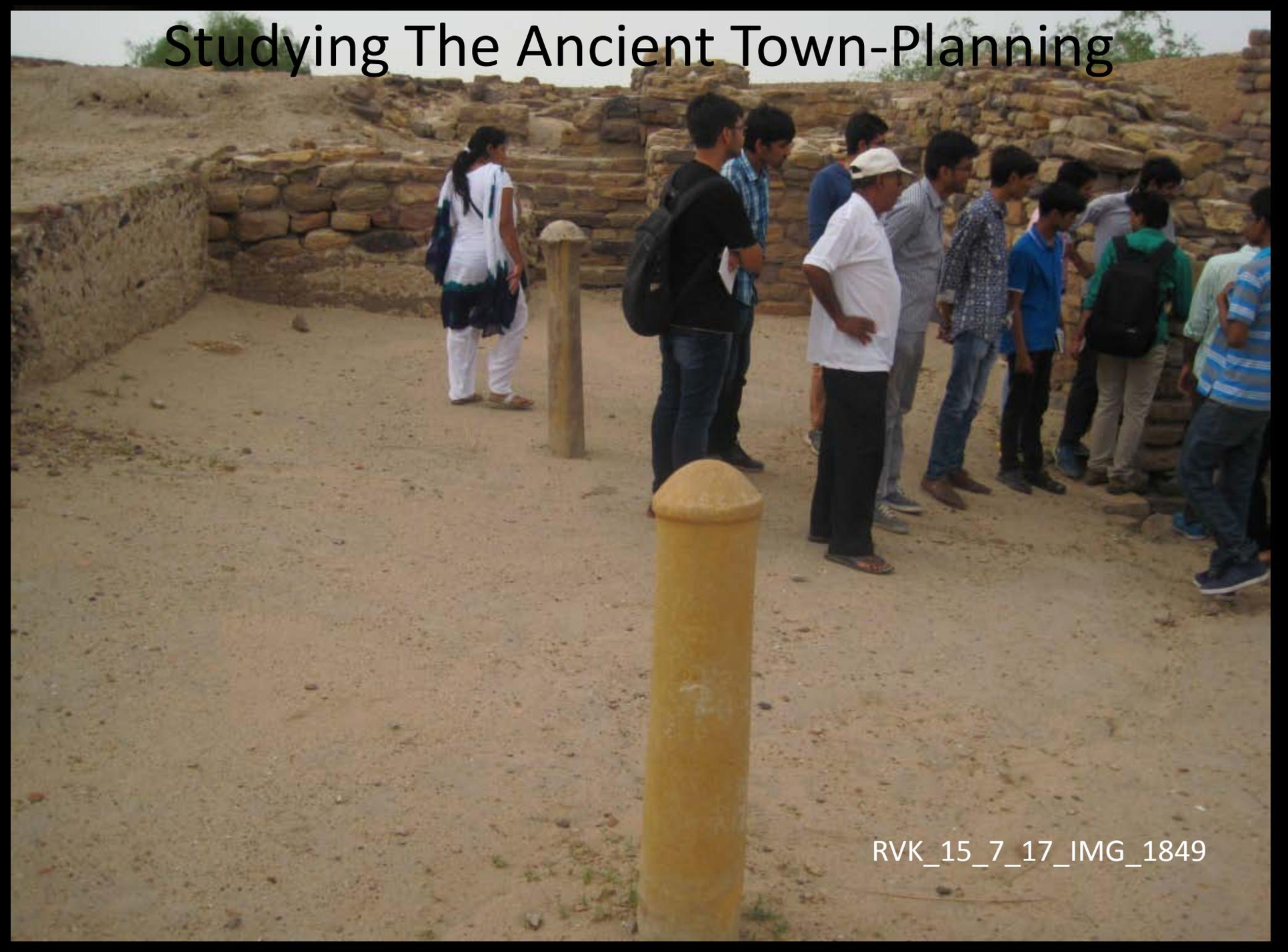
# DHOLAVIRA

4 – 5 Thousand Year Old Water Storage Tank

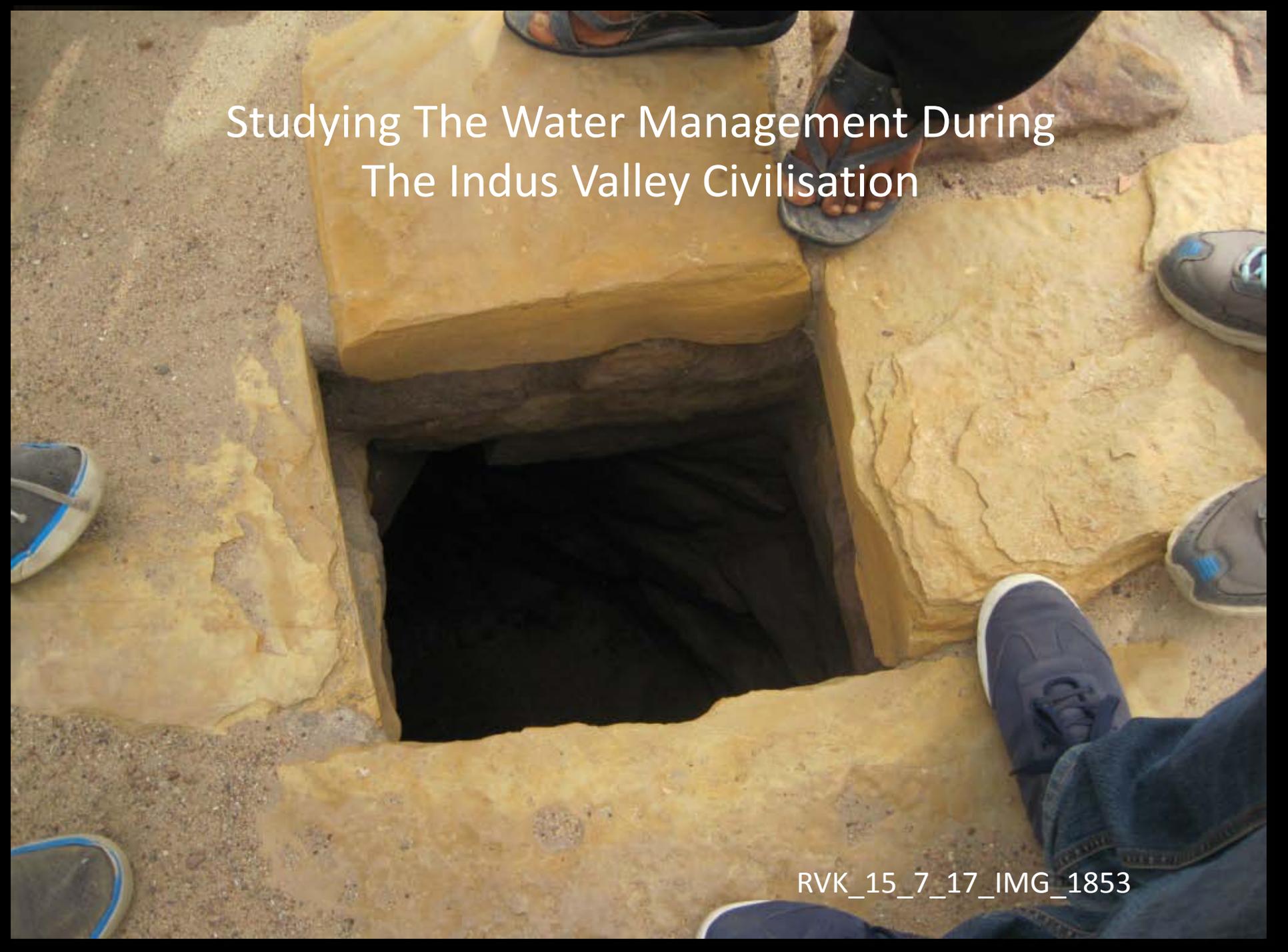


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# Studying The Ancient Town-Planning

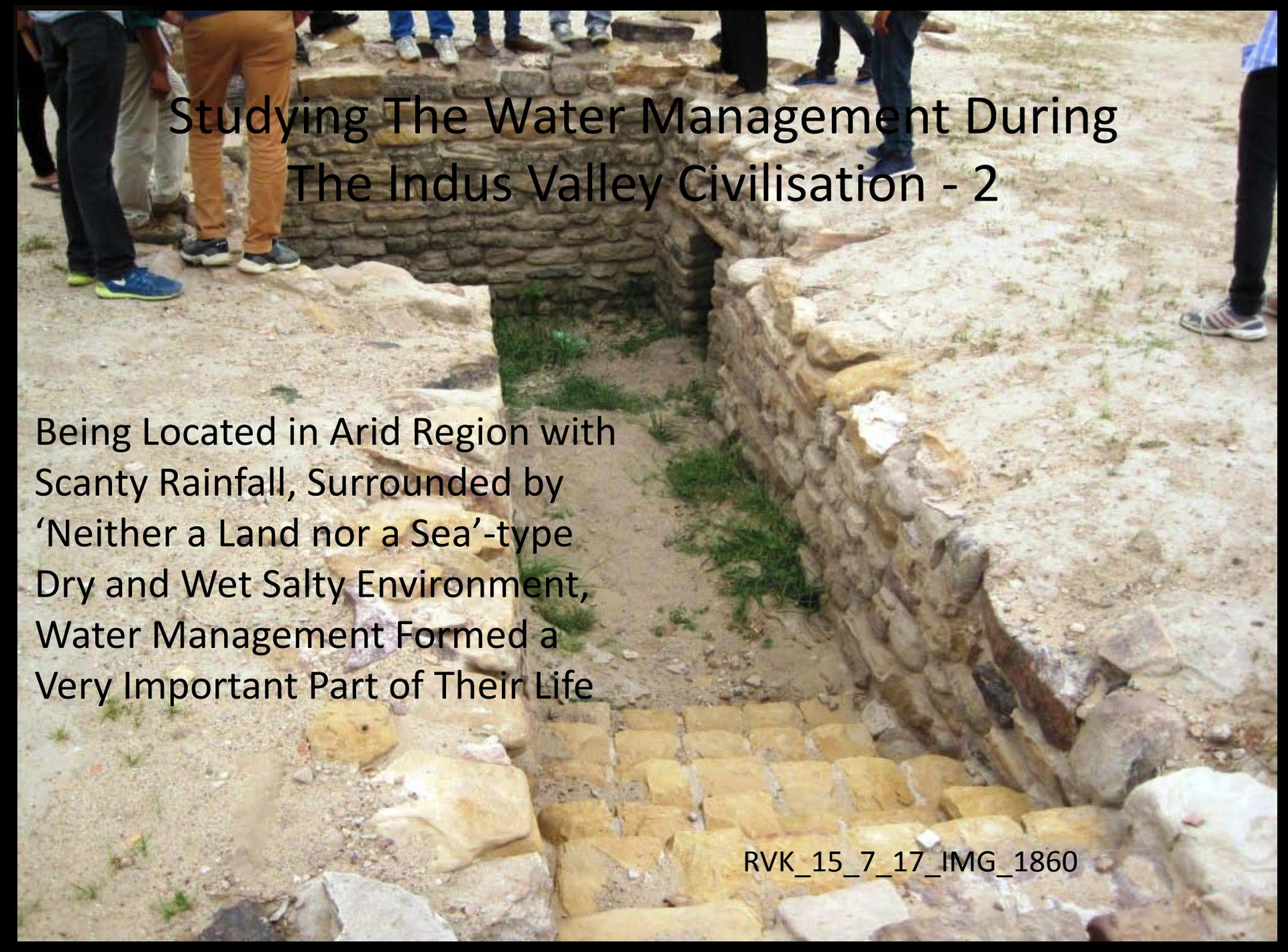


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Studying The Water Management During  
The Indus Valley Civilisation

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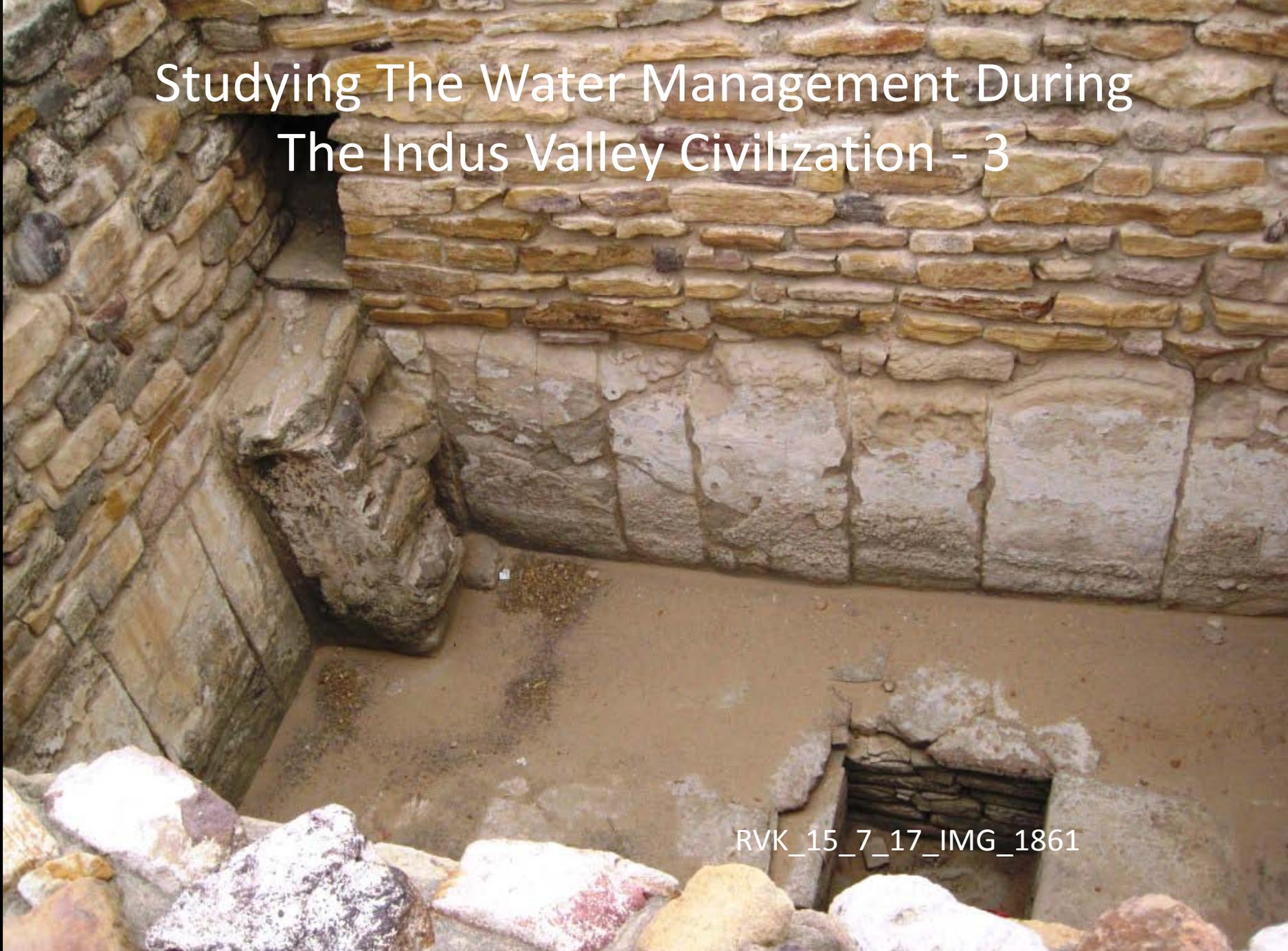


## Studying The Water Management During The Indus Valley Civilisation - 2

Being Located in Arid Region with  
Scanty Rainfall, Surrounded by  
'Neither a Land nor a Sea'-type  
Dry and Wet Salty Environment,  
Water Management Formed a  
Very Important Part of Their Life

# Studying The Water Management During The Indus Valley Civilization - 3

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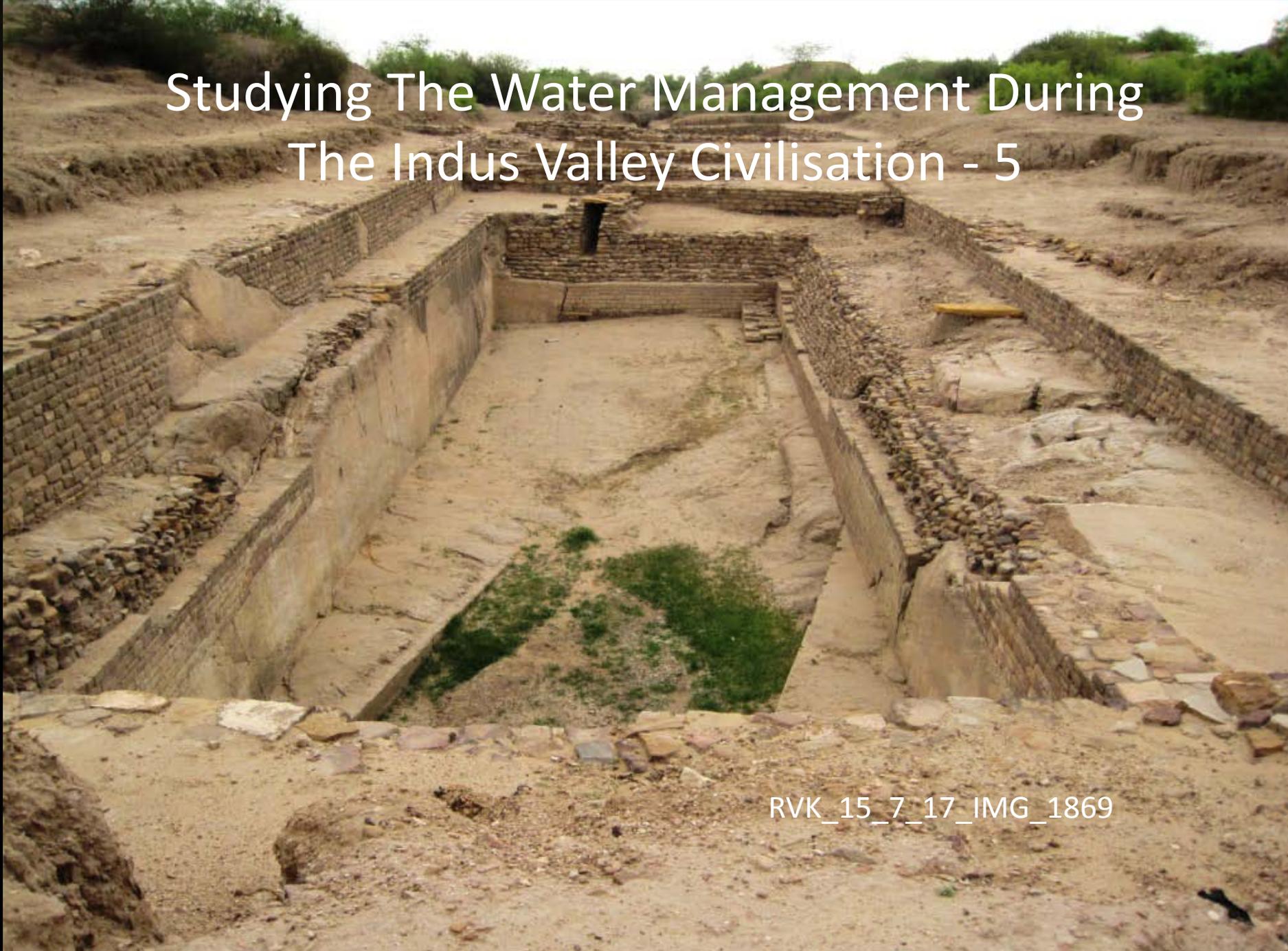
# Studying The Water Management During The Indus Valley Civilisation - 4

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# Studying The Water Management During The Indus Valley Civilisation - 5

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Rani-ki-Vav, Patan  
One Thousand-year-old  
'Step-Well'  
Water Storage Tank



The image shows the Rani-ki-Vav, a multi-tiered stepwell in Patan, North Gujarat, India. The structure is composed of numerous levels of intricate carvings and sculptures. The upper levels feature a variety of figures, including deities, celestial beings, and human figures in various poses. The carvings are highly detailed, with some figures appearing to be in conversation or performing rituals. The overall style is characteristic of the Chola or Chalukya periods. The stone is a light, weathered color, and the carvings are set against a background of more solid architectural elements. The perspective is from a low angle, looking up at the structure, which emphasizes its height and the density of the artwork.

Intricate Artwork  
Rani-ki-Vav, Patan; North Gujarat

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