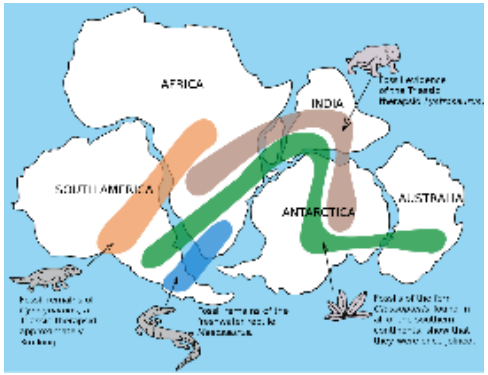
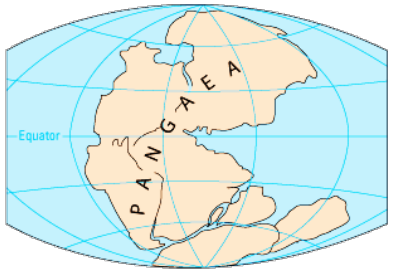
History of Settlements in Indian subcontinent

Subcontinent

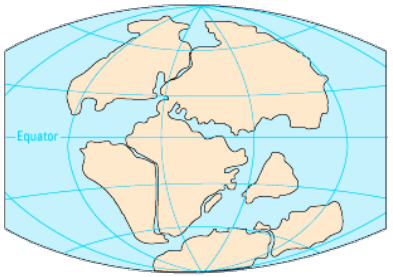
- 300 MLA (million years ago) – supercontinent PANGEA
- 230 MLA – dinosaurs appear
- 180 MLA – break-up of PANGEA into LAURESIA and GONDWANA
- 100 MLA - break-up of GONDWANA
- Indian craton passes over reunion hotspot – Deccan traps are created
- 60 MLA – Indian sub-continent (GONDWANALAND) collides with Asia (ANGWANALAND)
- 52 – 48 MLA – Formation of Himalayan Mountain Range
- 3 MLA – first modern humans appear existing along with other HOMINIDS,origin 'Homo Sapien'
- 2 MLA - Red Sea Rift Valley



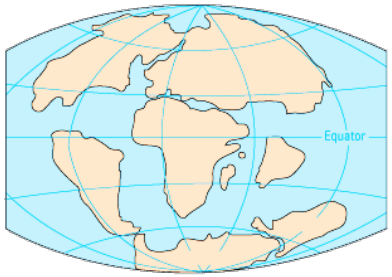


PERMIAN
225 million years ago

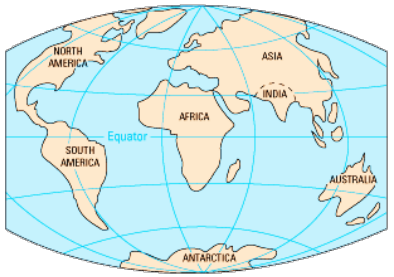
TRIASSIC
200 million years ago



JURASSIC
150 million years ago



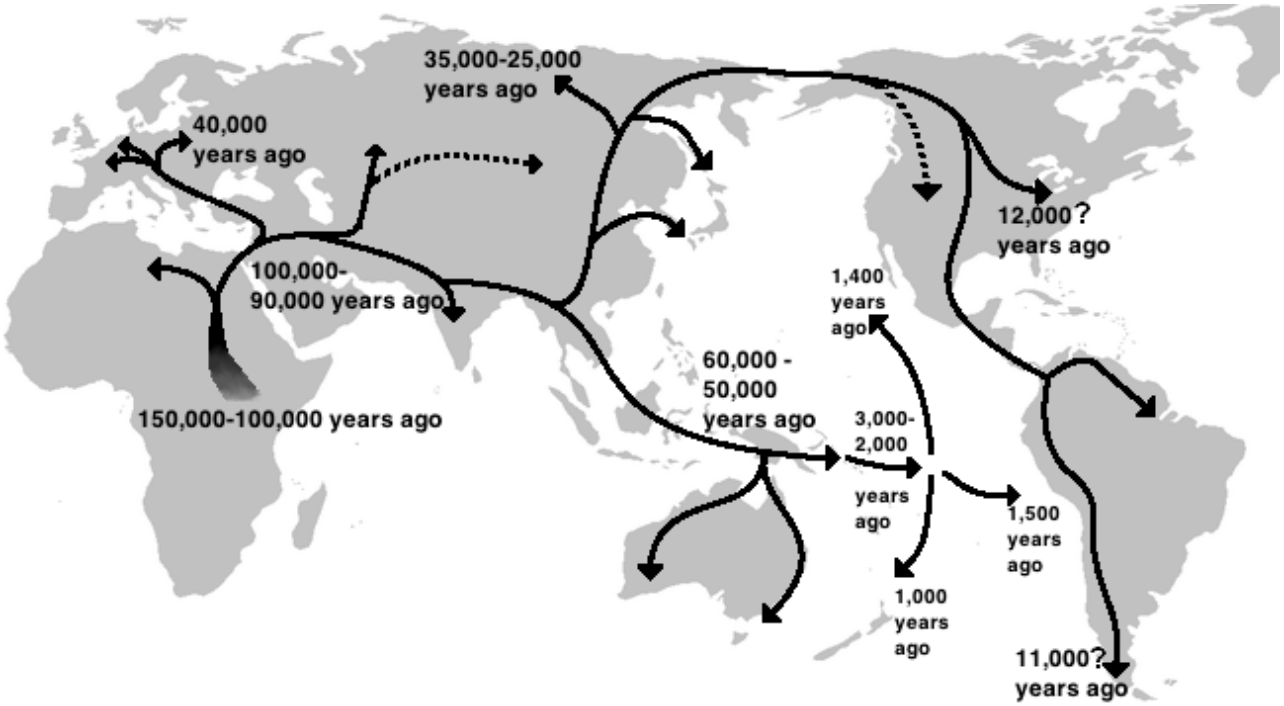
CRETACEOUS
65 million years ago

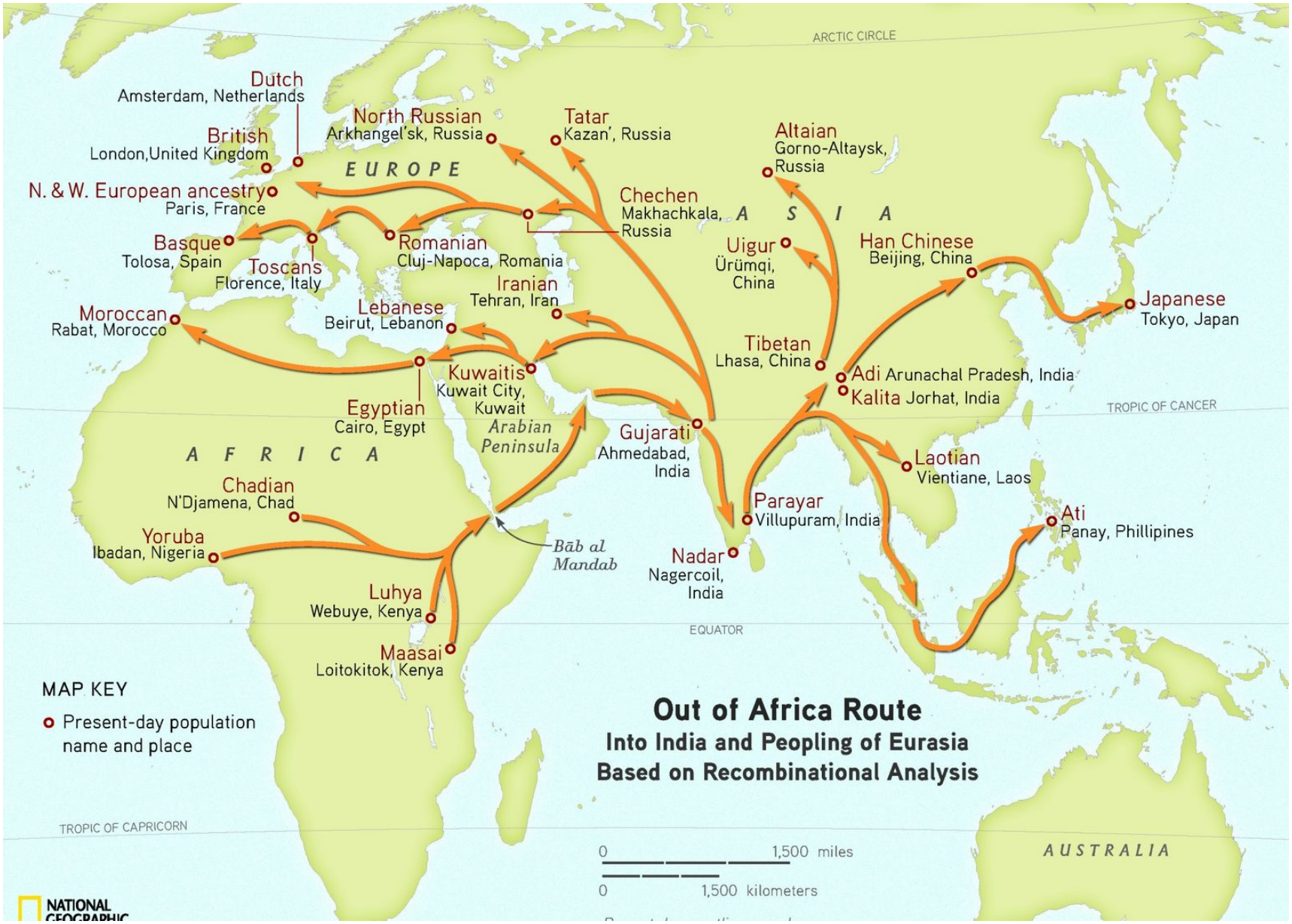


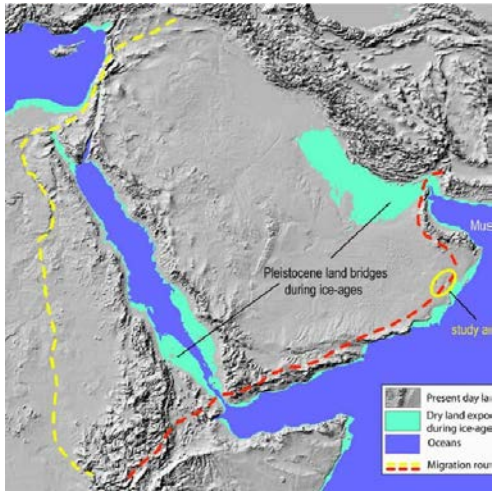
PRESENT DAY

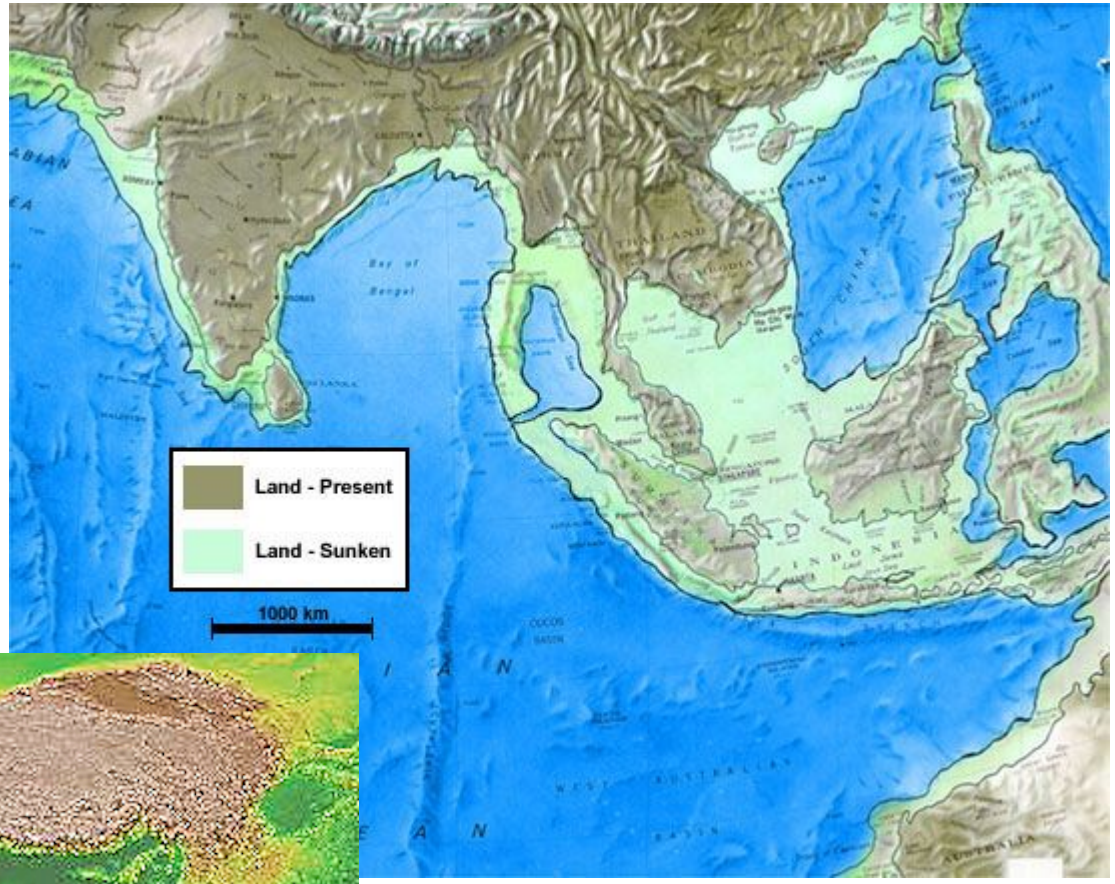
Timelines

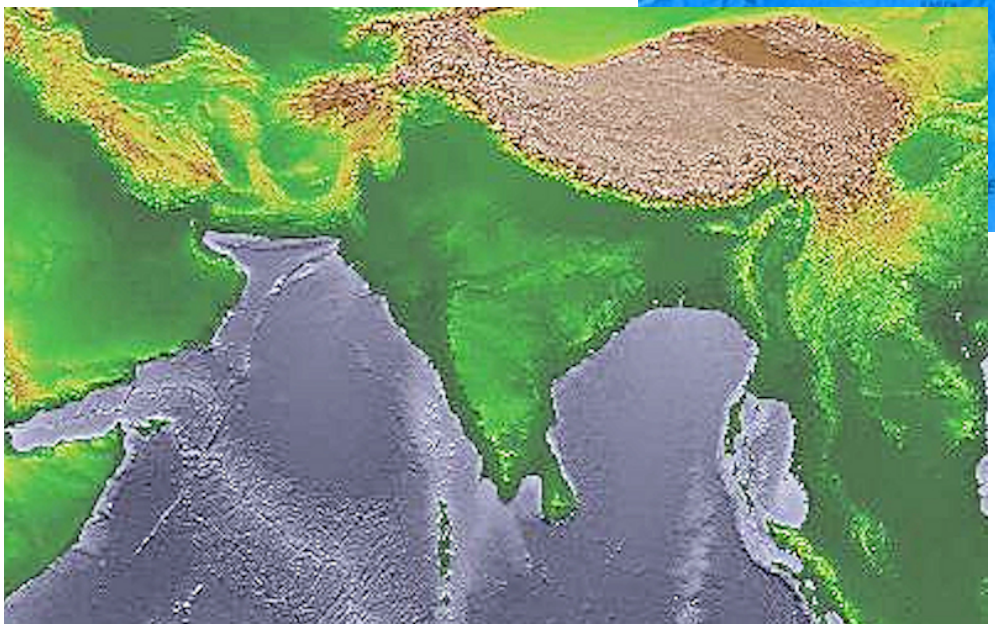
- **52 – 48 MLA – Formation of Himalayan Mountain Range**
- **3 MLA – first modern humans appear existing along with other HOMINIDS**
- **50000 – 40000 years ago – Modern Humans Appear in Indian Subcontinent**
- **14000 yrs ago - End of last Ice age (Ice Age Peak around 22000 yrs ago) –sea level rise by 120 metres, stable coastline – 7000 years ago**
- **Previous Ice age - 71000-57000 yrs ago**
- **75000 -70000 yrs ago successfulOut ofAfrica migration**
- **65000 - 40000 yrs ago - modern human populate central Asia and Europe**
- **40000 yrs ago - Neanderthals go extinct in Europe**
- **16000 yrs ago modern human reach America**




ARCTIC CIRCLE
Dutch
Amsterdam, Netherlands
British
London, United Kingdom
North Russian
Arkhangel'sk, Russia
Tatar
Kazan', Russia
Altaian
Gorno-Altaysk, Russia
EUROPE
N. & W. European ancestry
Paris, France
Chechen
Makhachkala, Russia
A S I A
Basque
Tolosa, Spain
Toscans
Florence, Italy
Romanian
Cluj-Napoca, Romania
Uigur
Ürümqi, China
Han Chinese
Beijing, China
Iranian
Tehran, Iran
Moroccan
Rabat, Morocco
Lebanese
Beirut, Lebanon
Japanese
Tokyo, Japan
Tibetan
Lhasa, China
Kuwaitis
Kuwait City, Kuwait
Adi Arunachal Pradesh, India
Kalita Jorhat, India
TROPIC OF CANCER
Egyptian
Cairo, Egypt
Arabian Peninsula
Gujarati
Ahmedabad, India
A F R I C A
Laotian
Vientiane, Laos
Chadian
N'Djamena, Chad
Parayar
Villupuram, India
Ati
Panay, Phillipines
Yoruba
Ibadan, Nigeria
Bāb al Mandab
Nadar
Nagercoil, India
Luhya
Webuye, Kenya
EQUATOR
Maasai
Loitokitok, Kenya
MAP KEY
Present-day population name and place
Out of Africa Route
Into India and Peopling of Eurasia
Based on Recombinational Analysis
TROPIC OF CAPRICORN
0 1,500 miles
0 1,500 kilometers
AUSTRALIA
NATIONAL GEOGRAPHIC


Pleistocene land bridges
during ice-ages
Present day la
Dry land expo
during ice-age
Oceans
Migration rou


Land - Present
Land - Sunken
1000 km



Settlement-origins and Indian Perspective

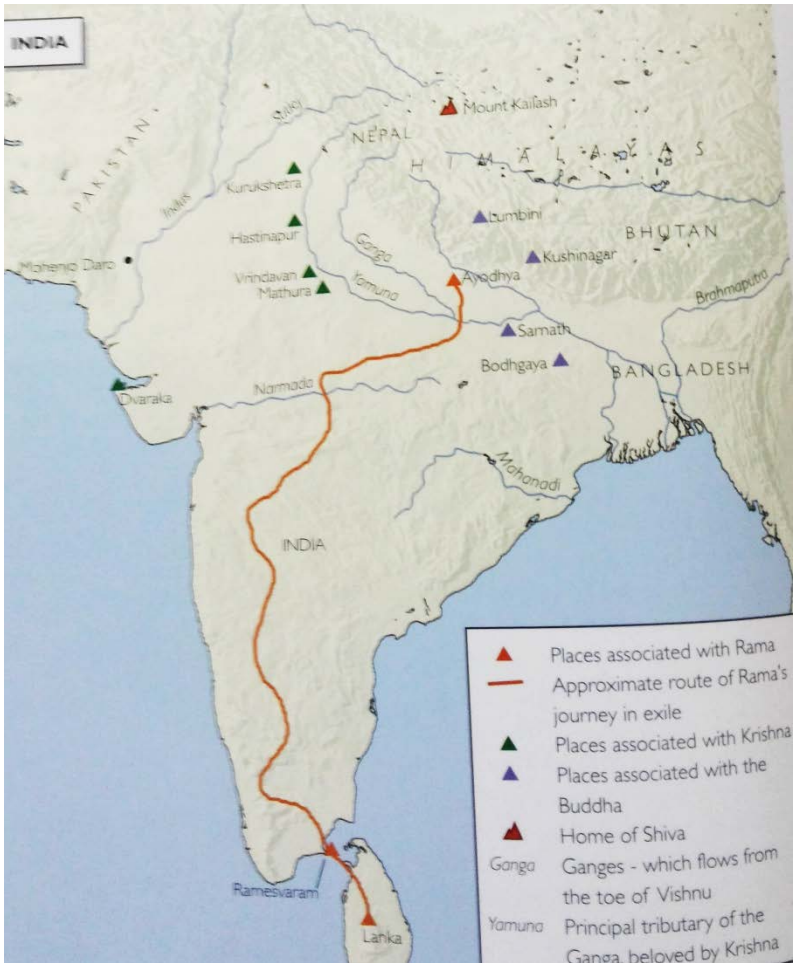
- Architecture accommodates the local , regional and cultural traditions and social requirements as well as economic prosperity.
- Indian Architecture evolved through various ages in different parts of the Indian Sub-continent as well as in parts of South –East Asia.
- The emergence and decay of great dynasties and external influences have shaped the history of India as well as settlement pattern.

Philosophy of Indian Architecture:

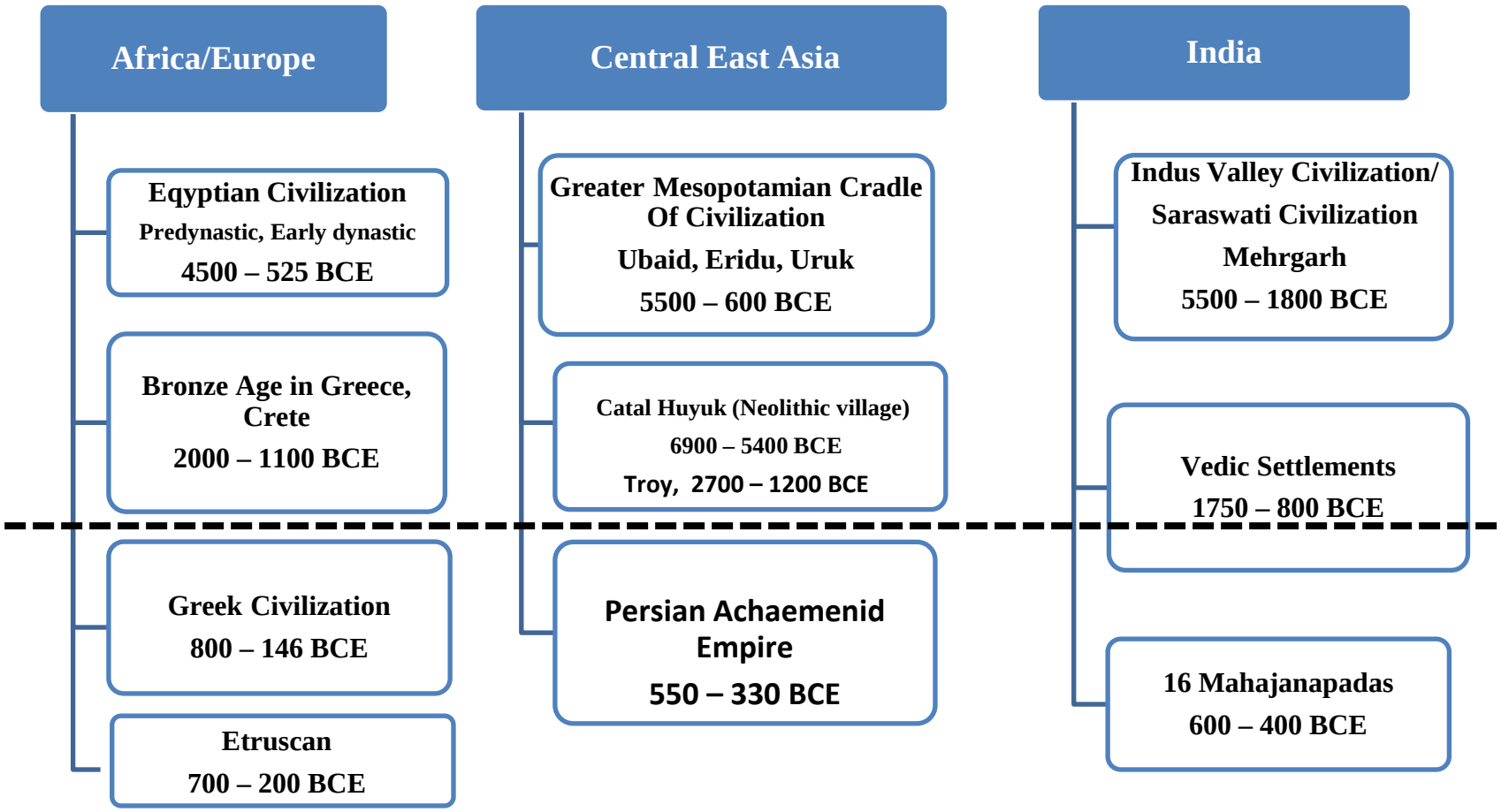
- Architecture in every civilization had a unique philosophy – a principle which would define it
  - Greek architecture was defined by their simplicity and refinement
  - Roman architecture was defined by their construction acumen

- Similarly Indian architecture can be distinguished by its focus on the community.

- Concepts like space – time dynamics, duality of existence, have been widely used in Indian architecture



Timelines

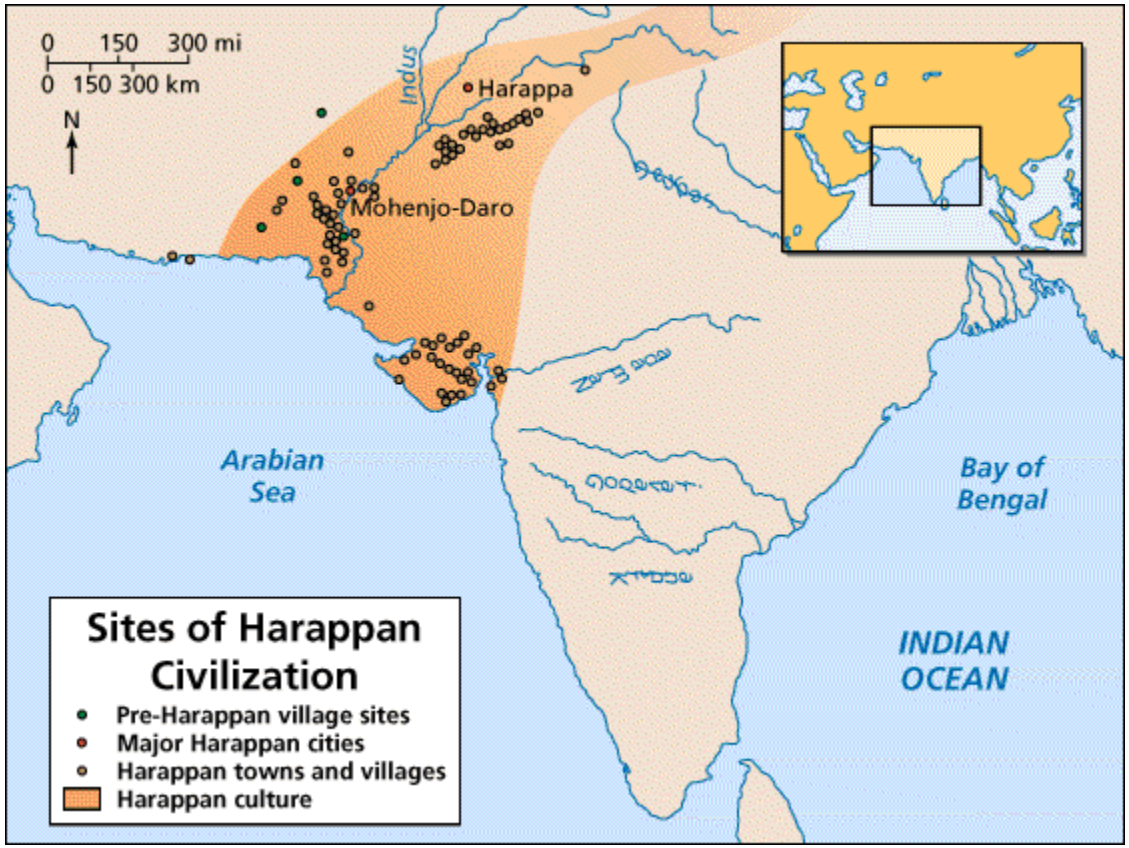


- Invention of wheel – 3600 BCE
- Pyramids – 2750 BCE (Step Pyramid – Zoser)
- Tombs and Dolmens – 4100-2500 BCE

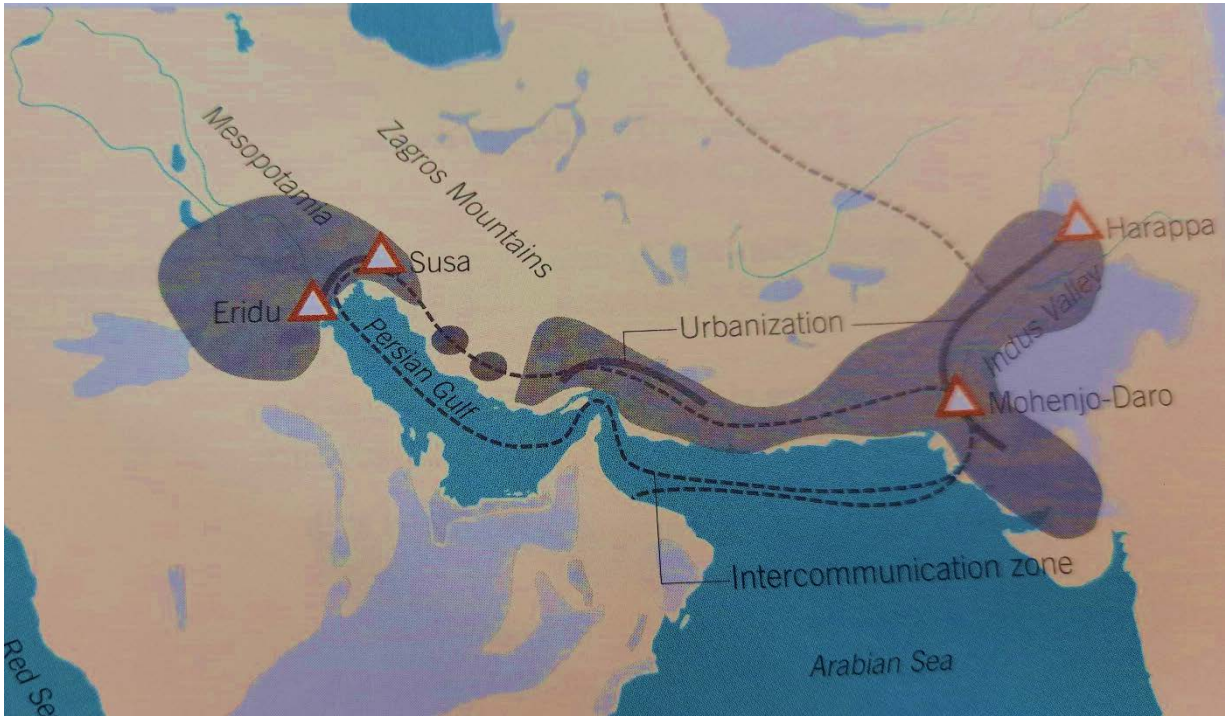
Brief timeline of Indian Architecture:

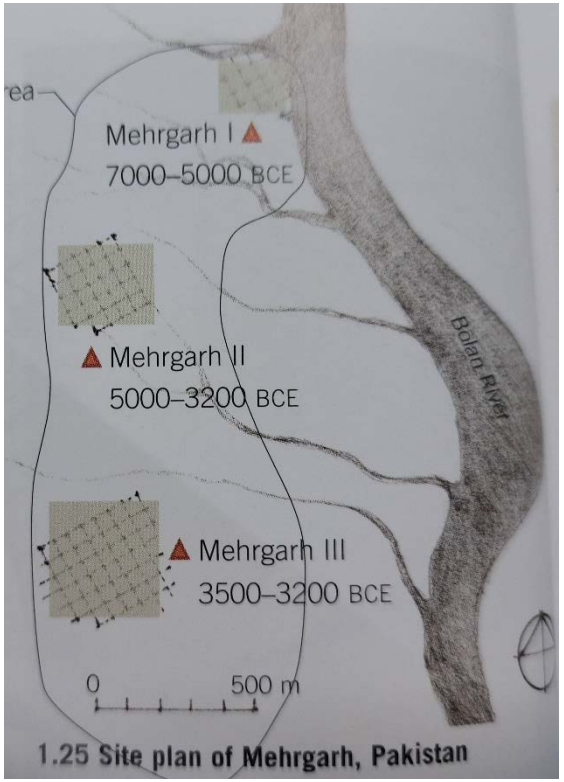
- **Stone age sites in India –** near **Narmada River Valley (Maharastra, Karnataka) , Saraswati-Indus River Valley**
- **Hominid Sites - Sivalik Region**
- **First Confirmed Semi-permanent settlement – 9000 yrs ago, BHIMBETKA rock shelter in Madhya Pradesh; Bhirrana in Haryana – 7500 BCE**
- **Neo-lithic culture- alleged to be submerged in Gulf of Khambat,** radio-carbon dated to **7500 BCE; Neolithic agriculture in Indus Valley Civilization 5000 BCE; Neolithic agriculture in lower Gangetic Valley – 3000 BC**
- **Indus Valley Civilization (3300 - 1700 BC) Bronze Age; Indus/Saraswati (Ghaggar-Hakra River) + Ganga-Yamuna Doab + Gujrat Deltaic Area + South Eastern Afganistan**

Indus Valley Civilization



Indus valley civilization marks the first evidence of settlement in the Indian sub-continent. Excavations have been made primarily at sites namely, Harappa, Mohenjo-daro, Dhaulavira, Lothal etc.. These settlements date back to 5000 BC and are contemporary to the Sumerian civilizations/Ancient Egyptian civilization





1.25 Site plan of Mehrgarh, Pakistan

Indus Valley Civilization

•7000 – 4000 BCE – Village and Communities

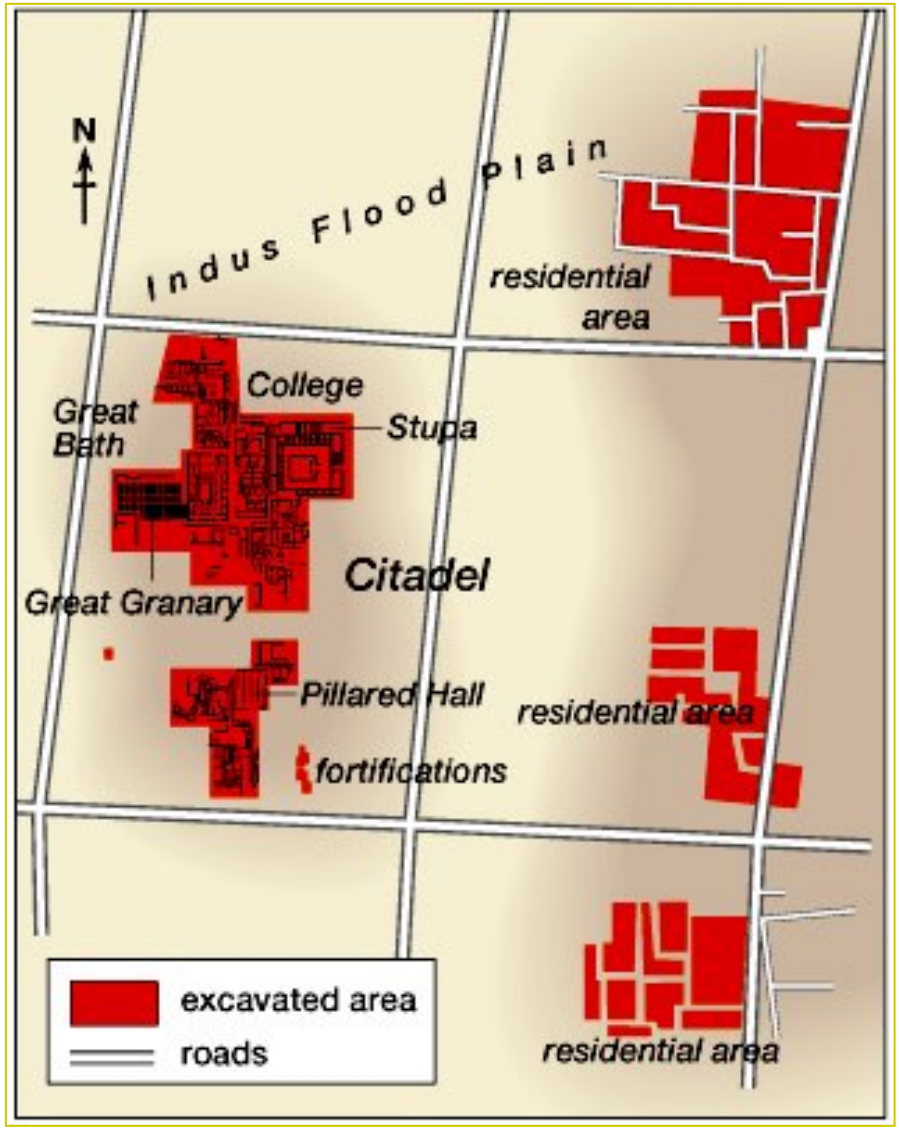
• 4300 – 3200 BCE – Farming and Pastoral Communities

• 3200 – 2600 BCE – Agricultural surplus, urbanization

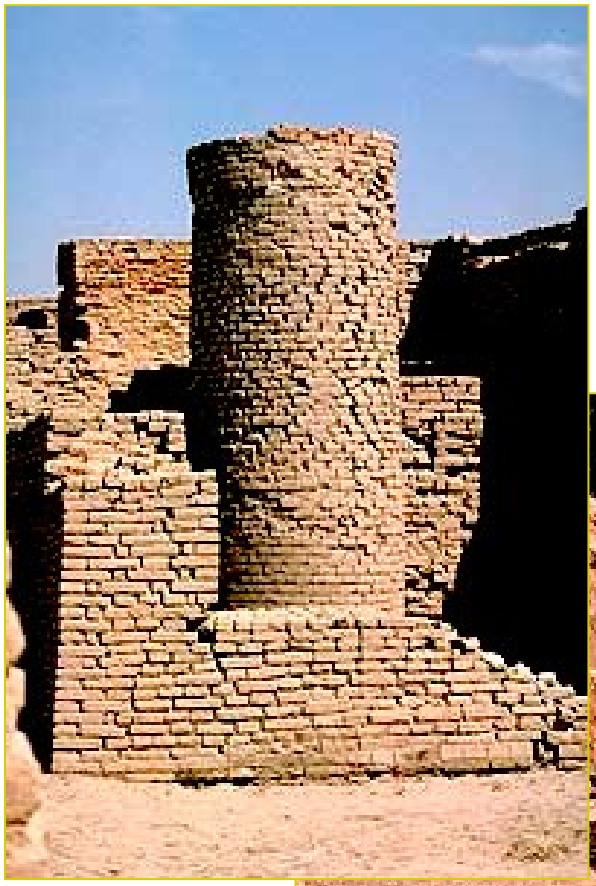
•2600 – 2500 BCE – Town Planning peak period

•2500 – 2000 BCE – scripture

•2000 – 1600 BCE – Dramatic Decline



Well, Mohenjo-Daro



Drain, Harappa

Public well, Harappa

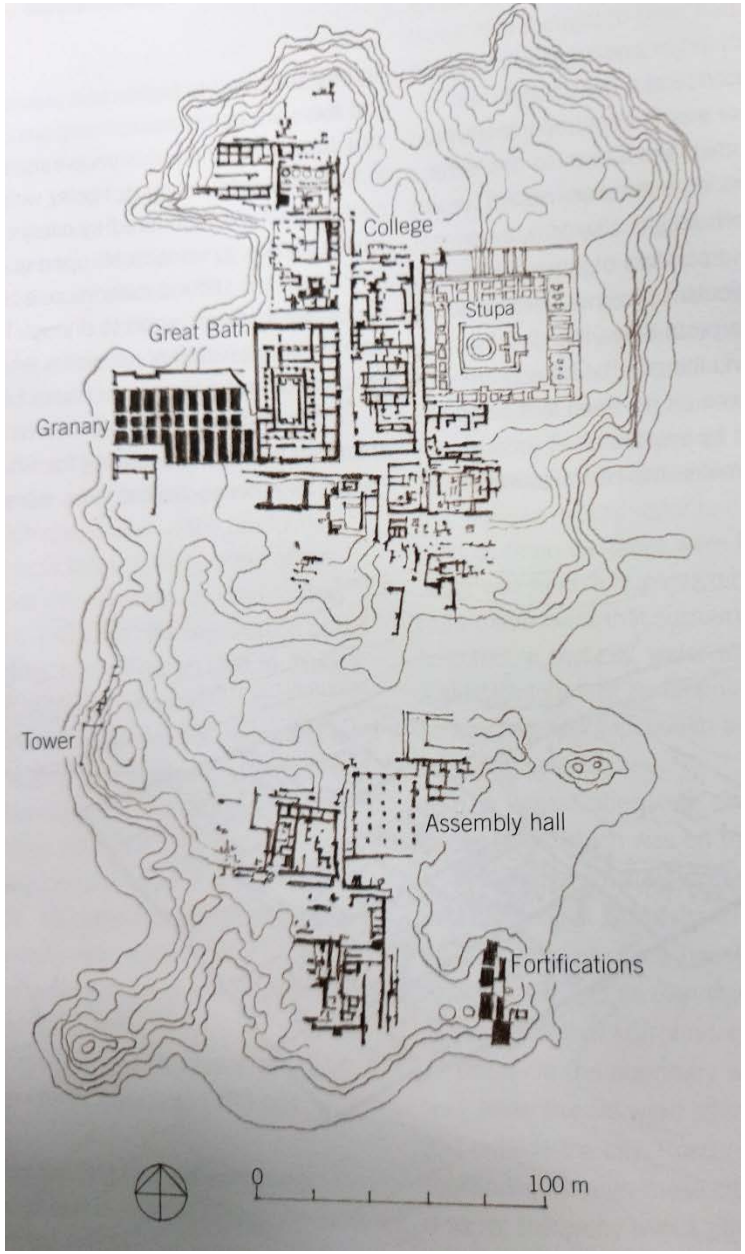
Indus Valley Civilization

• Some important settlements were excavated on the banks of the river Indus particularly at the bends that provided water, easy means of transportation of produce and other goods and also some protection by way of natural barriers of the river .

• All the sites consisted of walled cities which provided security to the people.

• Public buildings include granaries which were used to store grains which give an idea of an organised collection and distribution system.

•Along with large public buildings, there is evidence of residential quarters of different sizes - small one roomed constructions that appear to be working peoples quarters.




Mohenjo-
daro

Urban Fabric of Mohenjo-daro

Indus Valley Civilization

• The settlements reveal a well laid out, planned town in grid iron pattern which housed traders and other business class people.

• The buildings were made of standardized burnt mud- brick (using English bond), had strong orthogonal geometry and were stable without any surface embellishments.

• The upper stories of a building were built with timber and had flat roofs made out of wooden beams and planks finished with a top of beaten earth. Doors were in the side lanes to prevent dust from entering the houses.

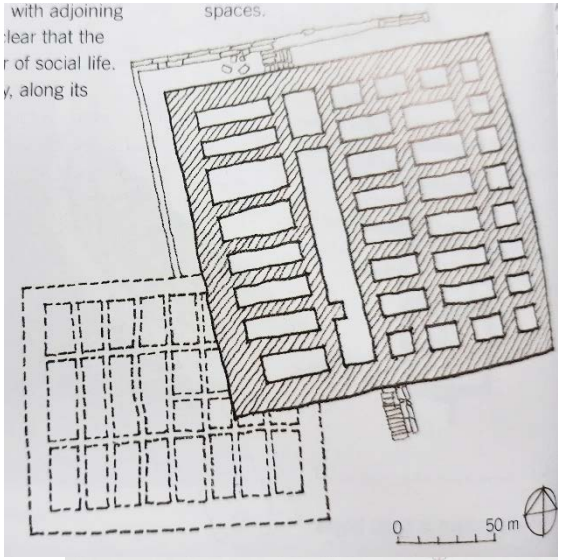
• The streets met at right angles and were oriented along the cardinal directions. There were well defined drainage system which was way ahead of its times.

• Apart from residences there are evidences of public buildings like markets, public baths etc. The 'Great Bath' as it is called, is still functional and had waterproofing treatment (bitumen)

•Most of the houses had private wells and bathrooms.

• Lothal, a site in Gujarat also has the remains of a dockyard proving that maritime trade flourished in those times.

Indus Valley Civilization

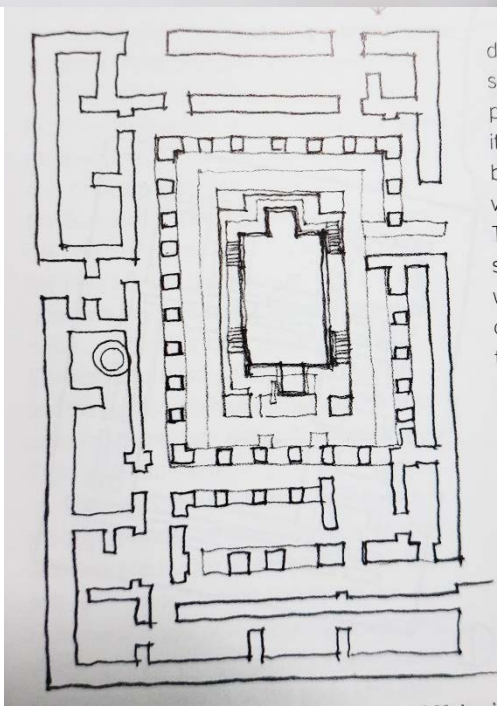


• Another remarkable feature was the existence of a well planned drainage system in the residential parts of the city. Small drains from the houses were connected to larger ones along the sides of the main roads. The drains were covered and loose covers were provided for the purpose of cleaning them.

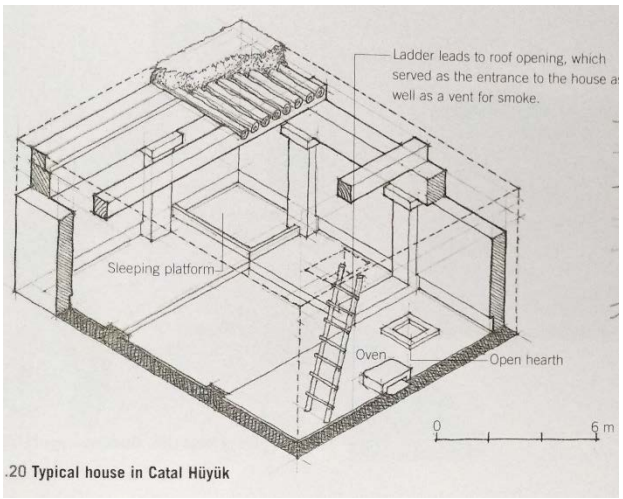
• The upper stories of a building were built with timber and had flat roofs made out of wooden beams and planks finished with a top of beaten earth.

• The streets met at right angles and were oriented along the cardinal directions. There were well defined drainage system which was way ahead of its times.

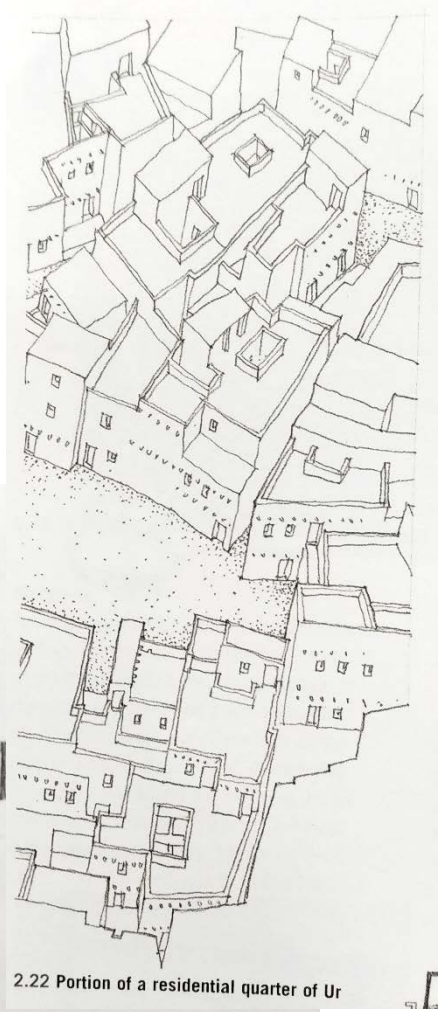
•At some sites a dominant citadal was excavated in the western part containing the public buildings including the granaries.



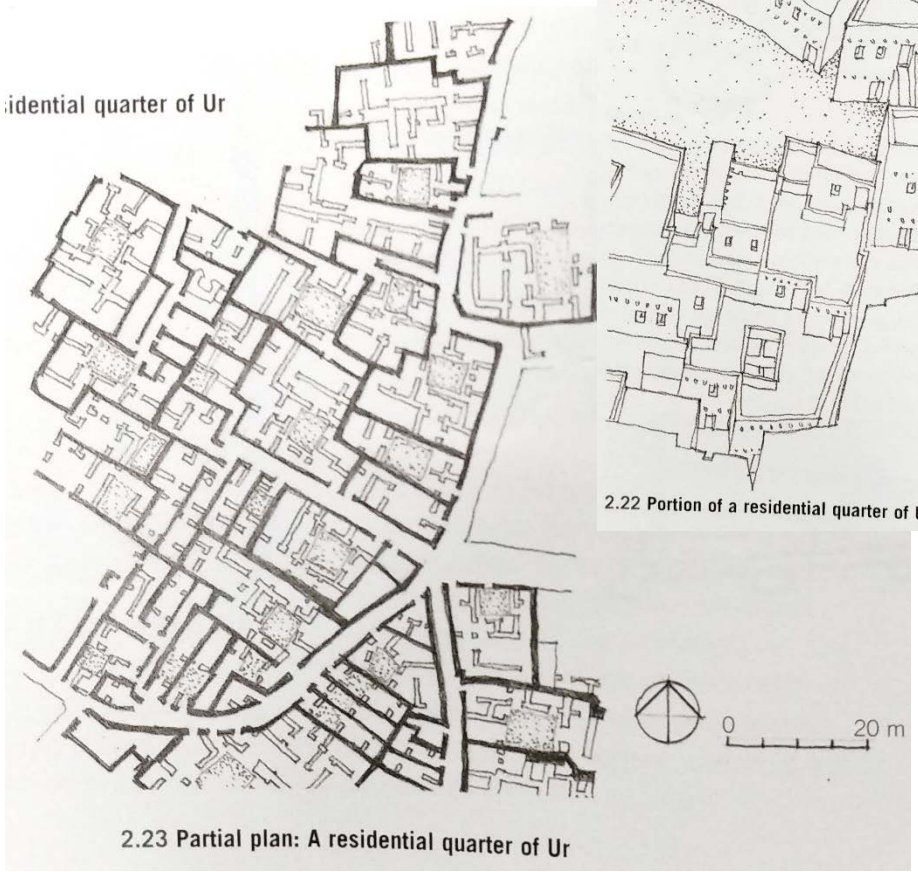
•Standardized systems of weights and measures
•Brick sizes – 10x20x40; 7x14x28



.20 Typical house in Catal Hüyük



2.22 Portion of a residential quarter of Ur



2.23 Partial plan: A residential quarter of Ur

Saraswati River

Paleo channel mapping have proven the existence of a wide and long river between Yamuna and Sutlej

The Sarawati River Basin has many faults existing across it, prone to tectonic activity

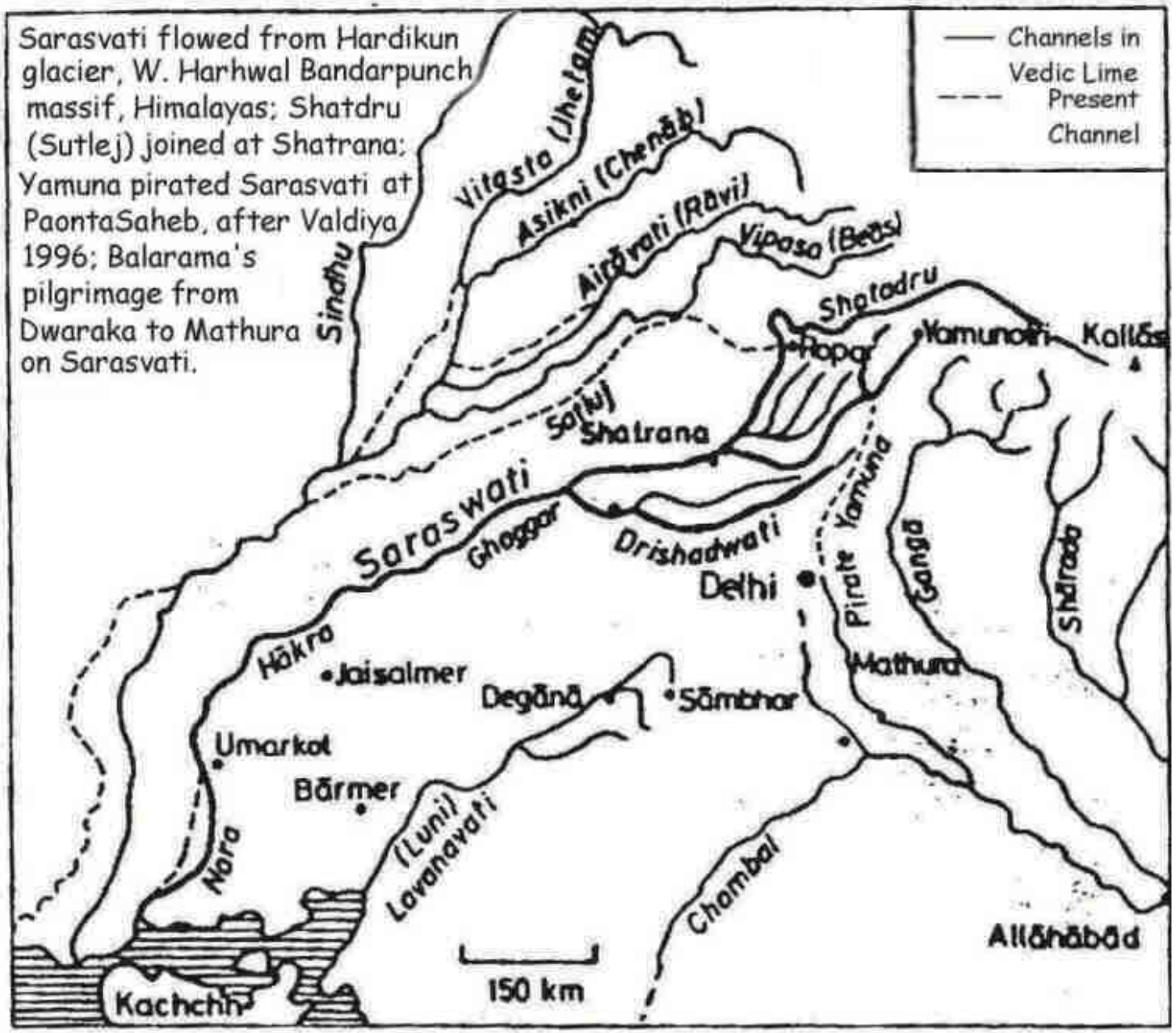
1400 archaeological sites are found on the banks of Saraswati and its tributaries.

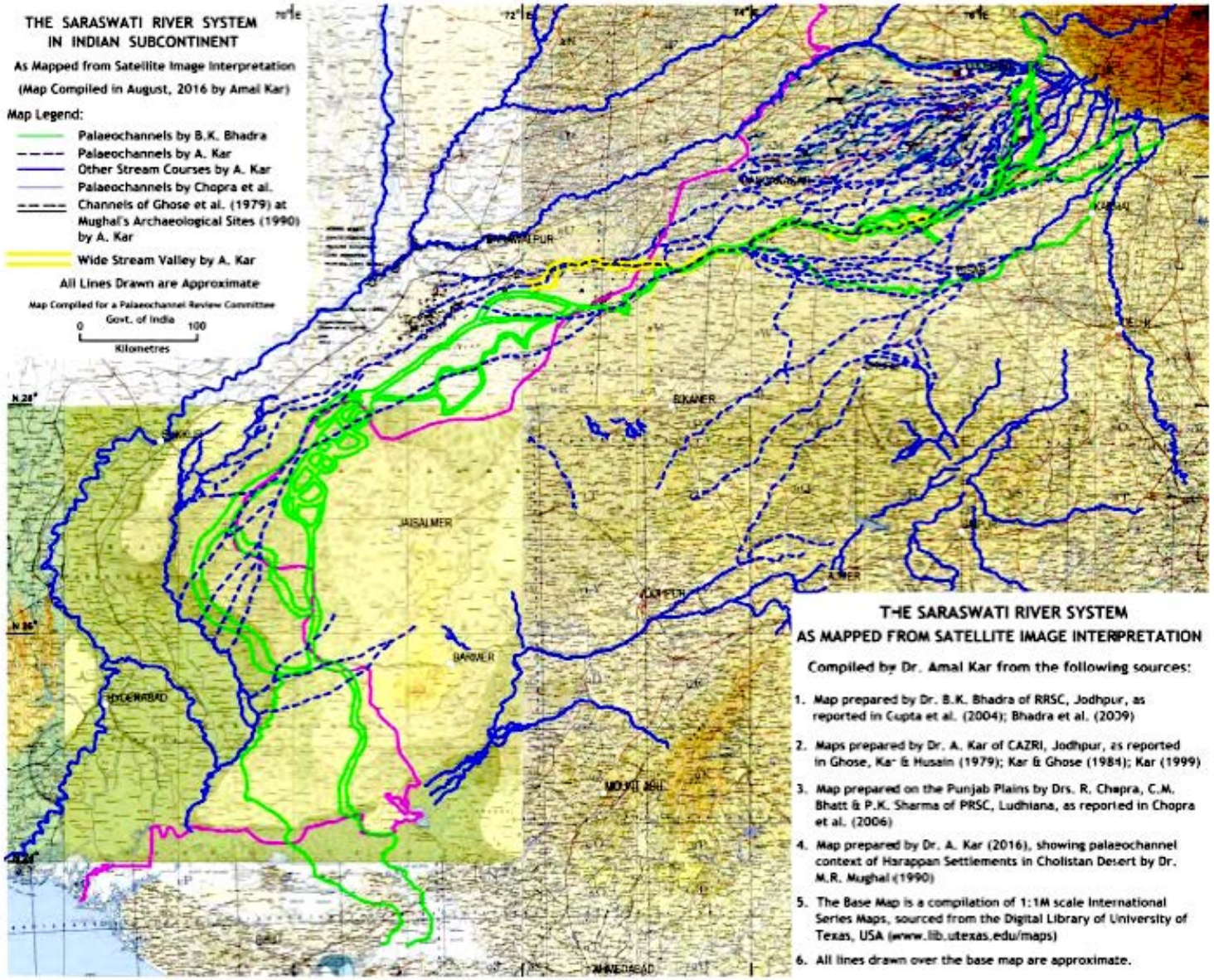
Rig Veda mentions seven mighty rivers flowing through Aryavarta – Saraswati being one of them

The sites of Indus/Sarawati Valley Civilization is spread over a huge area – one million sq. km.

The distance between Harappa and Mohenjo-Daro is 650 km

Saraswati River





. Palaeochannels recognised in the Ghaggar-Hakra-Nara, at the both basins, West of Aravalli Range

Saraswati River

River Drishadwati and Sutlej were a tributaries of Saraswati.

2450 +/– 150 BCE – Reactivation of Yamuna Fault

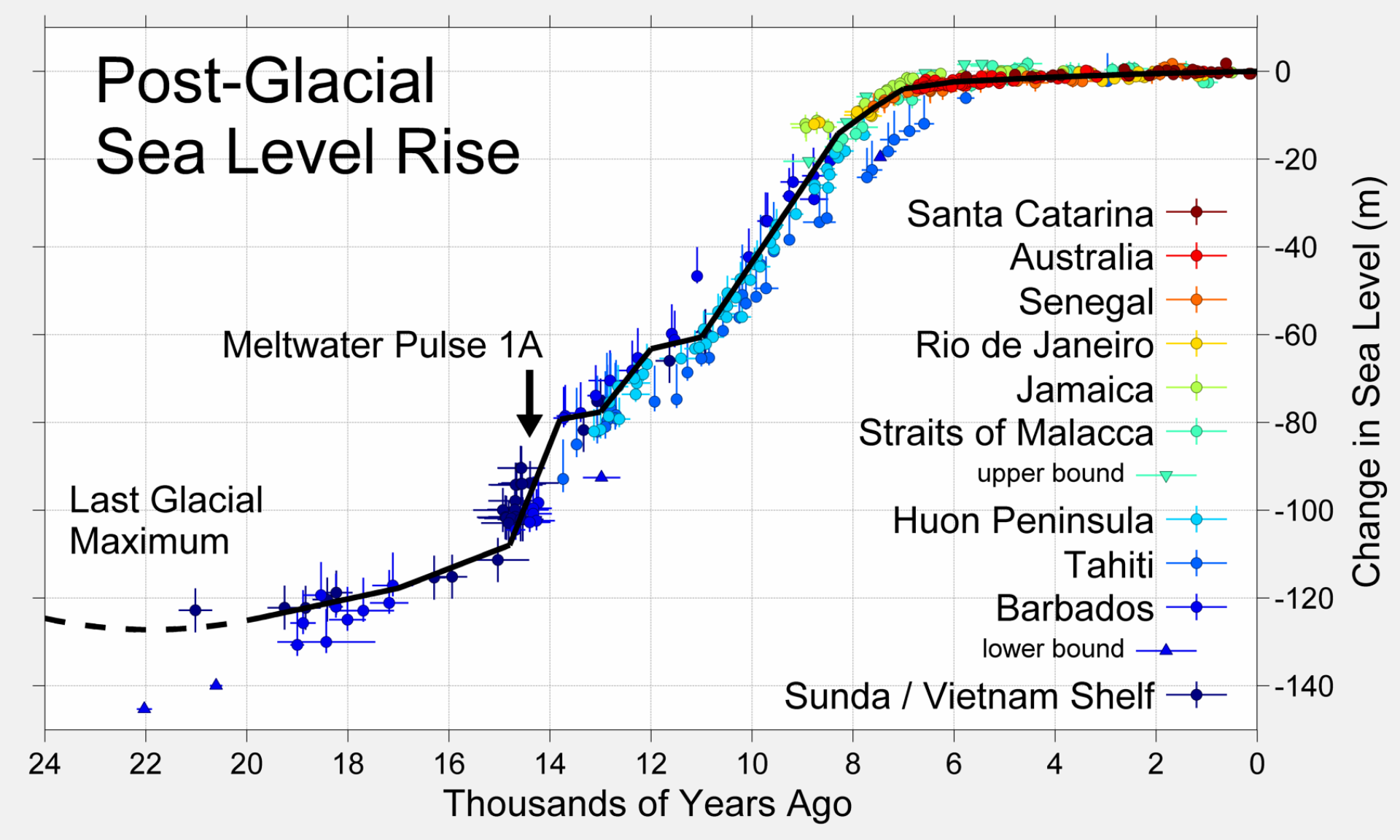
River Drishadwati shifted towards south-east and drained into Yamuna.

River Sutlej shifted to north-east around 1700 BCE

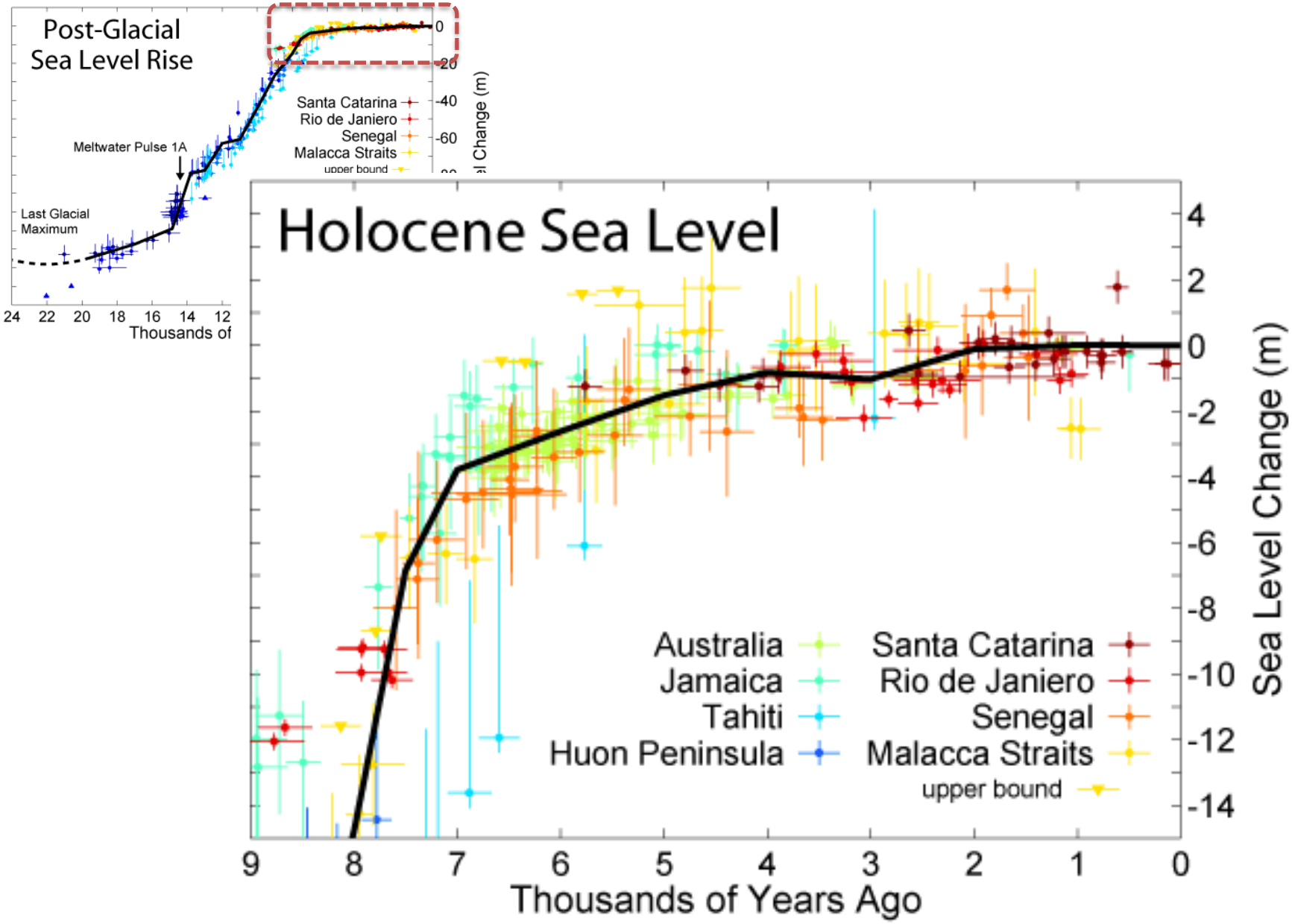
Cumuliative impact leaving River Saraswati - ephemeral

Table 1. Rainwater harvesting in response to climate fluctuations in India

Timescale	Period of climate change and aridity	Adaptation response for rainwater harvesting
ca. 4500 BC	The southwest (sw) monsoon started weakening after its peak intensification during 10–8 Kyr BP.	Origin of simplest earthworks in Thar desert, Rajasthan.
2894–2643 BC	2000 BC to 500 BC active monsoon conditions in the Indus Valley.	Definite evidence of human presence in Thar desert during 2894–2643 BC, i.e. even before the Indus Valley Civilization.
ca. 2600 BC	Weakening of the southwest SW monsoon.	Dholavira (Harappan civilization) develops rainwater harvesting systems such as tanks.
ca. 2300–1750 BC		Urban Harappan civilization develops earliest wells of their kind in South Asia; a sound agricultural base thrived because of rainwater harvesting and collection systems.
ca. 1600–1400 BC		Inamgaon chalcolithic settlement, near Pune, Maharashtra, provides evidence of artificial farm irrigation.
ca. 1500–1000 BC	Major weakening of the SW monsoon, increased and persistent aridity.	*Rigvedic* pastoral economy thrived in the presence of natural sources of water for cattle as well as earthworks constructed by early settlers in India.
ca. 1000–600 BC		Migration of people from early settlements along Indus to Rajasthan, Ganga Plain and Ganga–Yamuna Doab. Intensification of earthwork (Khadin) construction for farming in dry areas of Rajasthan with prior human occupations.
ca. 900–800 BC		Discovery and spread of iron technology provided impetus for forest clearing and start of agriculture in the Ganga Plain region. Although early farms were designed for *in situ* moisture conservation by erecting small earthen embankments, the later period saw increasing sophistication in rainwater collection, storage and distribution for agriculture.
ca. 600 BC		The rise of the Magadha empire and construction of earthworks for agriculture, and cultivation of aquatic nuts (*Trapa* species) in artificial earthworks (ponds).
ca. 324–185 BC		Refinement in theory and practice of rainwater harvesting during the Maurya period led to rapid agricultural development and geographic expansion of the empire. A period of sound emphasis by the rulers on the construction and management of a diversity of hydraulic earthworks for rainwater harvesting throughout the empire.
ca. 300 BC		Development of sophisticated irrigation system of tanks and canals in ancient Vidisha close to Sanchi. A rock-cut tank, located near the largest surviving Buddhist Stupa in which relics of the Buddha are believed to be present, could be one of the two oldest surviving tanks, second only to a now ruined tank in Bharahut, Central India.



This figure shows sea level rise the end of the last glacial episode based on data from Fleming et al. 1998, Fleming 2000, and Milne et al. 2005.

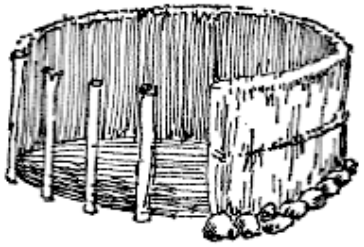


Vedic Settlement

- Use of Iron Tools
- Clearing of Forests in Indo- Gangetic Plain.
- Beginning of Sedentary agrarian Civilization.
- Rise of Village Communities.
- Geographic Expansion from Indus Valley to Gangetic Plain.
- Primary Ethnic Units: Tribes or Jana.
- Cattle Wealth and the formation of Ruling Lineages.
- Later village communities coalesced into monarchial state level polities – rise of early kingdoms
- Discovery of Iron in Eastern India had a major impact on trade

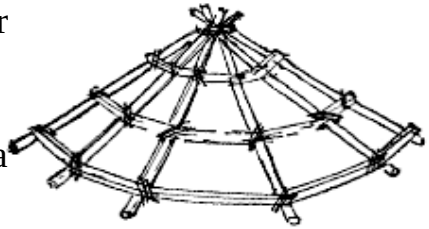
Vedic Settlements

After the fall of Indus valley civilization, the next evidences of buildings and settlements reveal that they no longer consist of well laid out cities or edifices with finished brick masonry



• Evidences of huts made out of thatch, reeds, leaves were found from the forests in central India.

•Initial settlement on the banks of the Rivers Indus, Saraswati and Ganga. Later spread along important river banks.



• Vedas offer description of the way of Vedic Life – Rig Veda, Yajur Veda, Sama Veda, Atharva Veda.

• foundations of the old city of Rajgriha dated at 800 BC (earlier capital city of Magadha) indicate that circular buildings were common. Huts were made of circular wall of bamboos held together with twigs etc. and with a domical roof of leaves or thatched roof (grass).

•Later evidences of Vedic huts were oval in plan. They had a barrel shaped roof covered with thatch which was created by tying a bent bamboo on two ends with fastener to obtain a bow like form. An embryo tied rod was used to retain the shape.

• This form has been replicated in stone in Buddhist architecture and is referred to as a '*chaitya*' or a sun window.

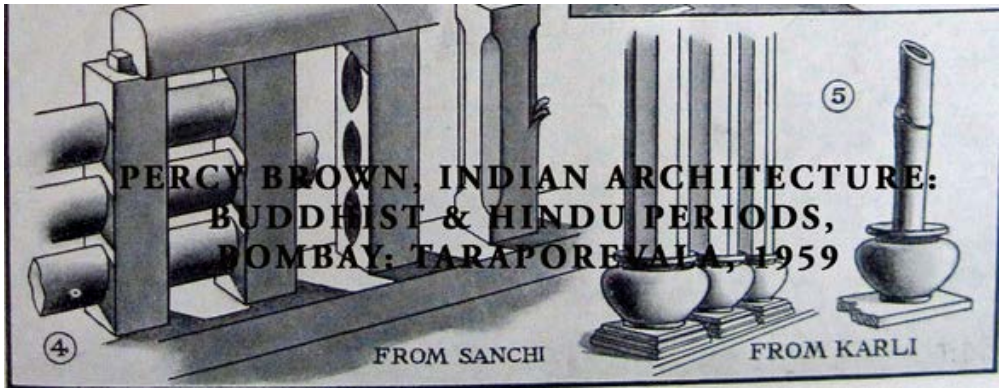
Vedic Architecture: Characteristic features

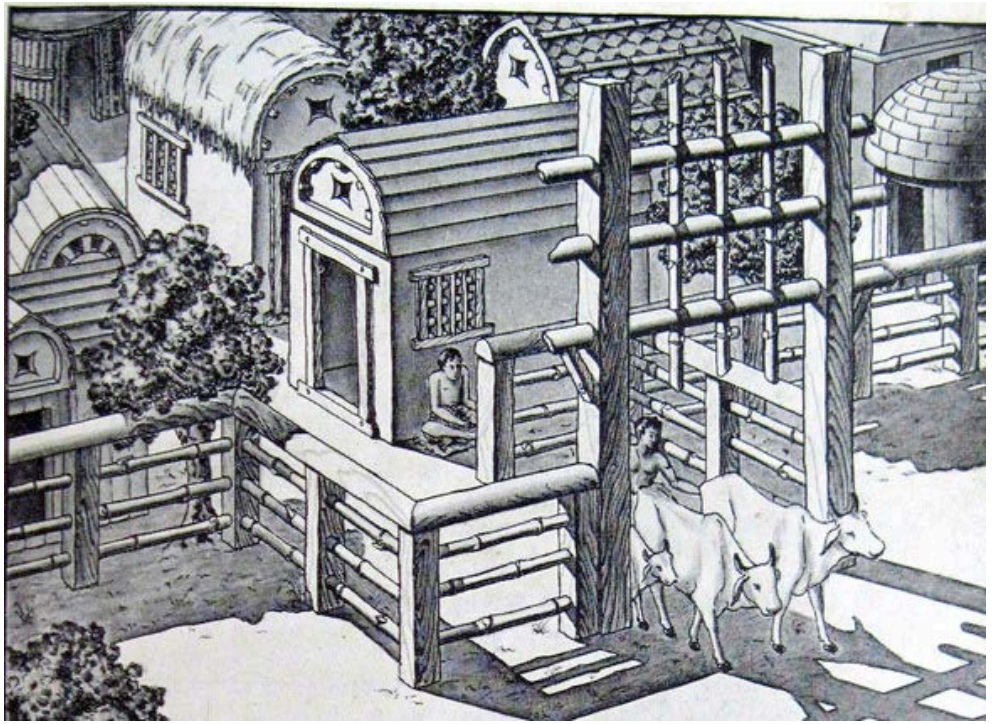
• The kind of buildings erected by the early dwellers in Vedic age has been documented in Vedas and in carved bas-relief on the railing of stupas at Sanchi and Barhut

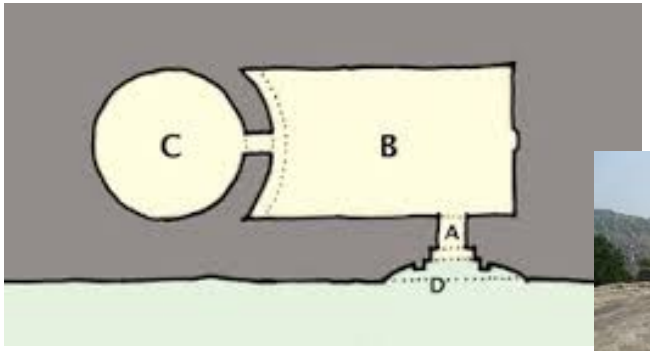
• Evolution pattern of these settlement reveal the use of the courtyard form for a group of dwellings surrounded by a bamboo fence consisting of vertical members (*thabha*) and three horizontal members (*suchi*). This fence has been a symbol of protection and used in fields, sacred monuments etc. This form has been translated in stone and used in stupas

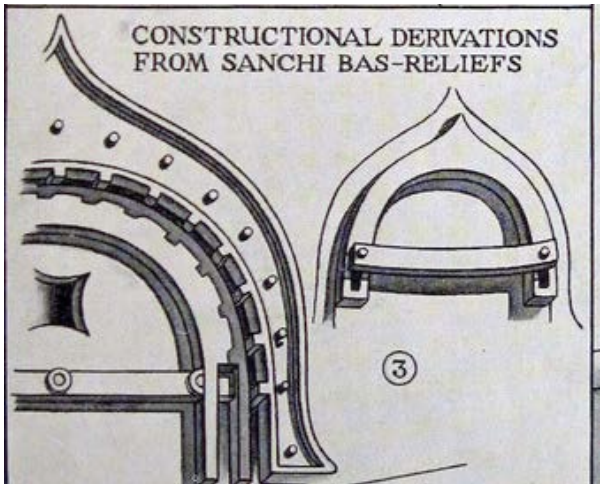
• Gateways to these fencing (*gamadvara*) were also made out of bamboo resembling a primitive portcullis. These gateways were primarily used for passage of cattle to their pastures. This form has inspired the *gopurams* (which were built for the same purpose) in temple cities of south India. More importantly these bamboo gateways were replicated in Buddhist archways known as '*Toranas*' and find extensive use in Buddhist architecture of the Fart East ('torii' in Japan and 'piu-lu' in China)

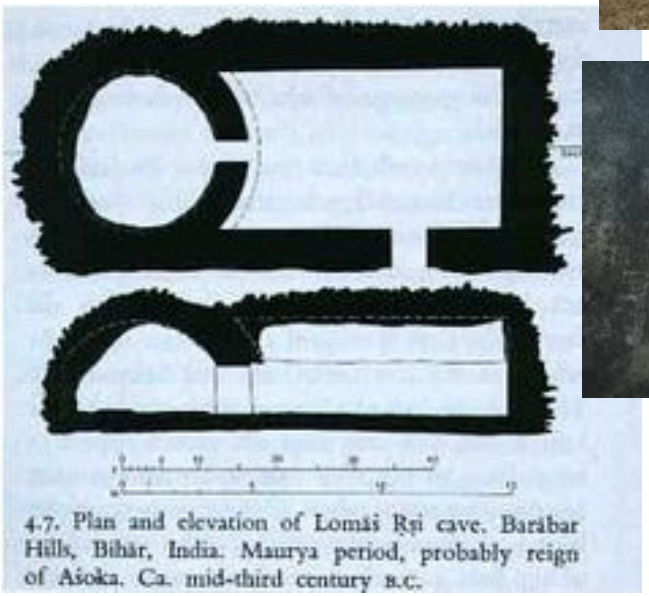
•The most important feature of the Vedic period was the making of fire altars which soon became an important and integral part of the social and religious life of the people


PERCY BROWN, INDIAN ARCHITECTURE:
BUDDHIST & HINDU PERIODS,
BOMBAY: TARAPOREVALA, 1959
4
FROM SANCHI
5
FROM KARLI









4.7. Plan and elevation of Lomāś Ṛṣi cave. Barābar Hills, Bihār, India. Maurya period, probably reign of Aśoka. Ca. mid-third century B.C.

References

•Ching, D. K. Francis, Jarzombek, Mark, and Prakash, Vikramaditya (2011). A Global History of Architecture, 2nd Edition, John Wiley & Sons.

•Fleming, Kevin, Paul Johnston, Dan Zwartz, Yusuke Yokoyama, Kurt Lambeck, and John Chappell (1998). "Refining the eustatic sea-level curve since the Last Glacial Maximum using far- and intermediate-field sites". *Earth and Planetary Science Letters* **163** (1-4): 327-342. doi:10.1016/S0012-821X(98)00198-8

•Fleming, Kevin Michael (2000) *Glacial Rebound and Sea-level Change Constraints on the Greenland Ice Sheet*, Australian National University PhD Thesis

•Milne, Glenn A., Antony J. Long and Sophie E. Bassett (2005). "Modelling Holocene relative sea-level observations from the Caribbean and South America". *Quaternary Science Reviews* **24** (10-11): 1183-1202. doi:10.1016/j.quascirev.2004.10.005

•Palaeochannels of North West India: REVIEW AND ASSESSMENT, REPORT OF THE EXPERT COMMITTEE TO REVIEW AVAILABLE INFORMATION ON PALAEOCHANNELS, 15 Th OCTOBER, 2016, New Delhi, http://cgwb.gov.in/Ground-Water/Final%20print%20version_Palaeochannel%20Expert%20Committee_15thOct2016.pdf

•Pandey, Deep Narayan, Gupta, Anil K. AND Anderson, David M. (2003), Rainwater harvesting as an adaptation to climate change, Current Science, Vol.85, No.1, pp46-59.

•Textbook of Town Planning (2000) Bandyopadhyay, Abir, Published by Books & Allied Ltd, ISBN8187134658 (ISBN13: 9788187134657)