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Climate Change and the Decline of Indus Valley Civilisation

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A new study titled 'Neoglacial climate anomalies and the Harappan metamorphosis', conducted by an international team of scientists suggests that **climate change may have led to the decline of the Indus Valley Civilisation.**

- The study looked at **sediments from the Arabian Sea from the continental margin of Pakistan**, reconstructed the Indian winter monsoon for the last 6,000 years, and examined undersea fossils and marine DNA.
- The seafloor near the mouth of the Indus is a very low-oxygen environment, so whatever grows and dies in the water is very well preserved in the sediment. Hence, it was used as a sample.
- Indian monsoon is the annual phenomenon that collects moisture from the Indian Ocean and spreads it over the Indian subcontinent in the form of rainfall. It influences climate in the region on a large scale and is crucial for the prevalence of annual weather patterns. A sizable population in the region, which is engaged in agriculture, depends on monsoon for their livelihood and survival even in the present time.

A Brief History

- More than 4,000 years ago, the Harappa culture thrived in the Indus River Valley of what is now modern Pakistan and northwestern India.
- They built sophisticated cities, invented sewage systems that predated ancient Rome's, and engaged in long-distance trade with settlements in Mesopotamia.
- However, by 1800 BCE, this advanced culture had abandoned their cities, moving instead to smaller villages in the Himalayan foothills.

Findings of the Study

- First, a **wetter winter monsoon** may have led to urban Harappan society turning into a rural one, as inhabitants migrated from a summer flood-deficient river valley to the Himalayan plains.

- Later, **a decline in the winter monsoon** could have played a role in the demise of the rural late Harappans.
- **A shift in temperatures and weather patterns** over the Indus Valley caused summer monsoon rains to gradually dry up, making agriculture difficult or impossible near Harappan cities.
- Records for the last 4,500 years generally indicate that temperatures were lower than the Holocene thermal maximum. A general cooling, known as the neoglaciation, occurred between 2,500 and 4,500 years ago.
- **Floods in the Indus and tributary rivers became less severe** and probably less predictable which affected the Indus people who depended a lot on inundation agriculture.
- Changing character of the Indian monsoon affected atmospheric temperatures and the flow of rivers originating in the Himalayas. Both the changing temperature and the changes in river flow would have influenced the crops that were grown in the region.
- **Ghaggar-Hakra**, which is the probable course of the Saraswati river, dried at the same time.
- Between 4,500 and 3,000 years ago, strong winter monsoons were characterised by “early neoglacial anomalies (ENA)” that is characterised by changes in wind and precipitation patterns that are evident across the eastern Northern Hemisphere and tropics.
- It was this coordinated climate reorganisation that may have helped trigger the transformation of the urban Harappan civilisation into a rural society. During that time the Indo-Aryan culture was arriving in the region with Iron Age tools and horses and carts.

Significance of the Study

- The Indus story is important today because it provides us with a vivid example of what climate change could do to people. The Indus people were smart and had ways to cope with climate.
- The study provides a powerful lesson for today as the migration out of Syria and African countries has some roots in climate change.
- Also, sea level rise in recent times due to climate change can lead to huge migrations from low lying regions like Bangladesh, or from hurricane-prone regions in the southern U.S.
- The Harappans could cope with the change by migrating but owing to the existing rigid political boundaries with the increasing tendency of protectionism, this option is nearly closed in today's global scenario which ultimately can cause political and social convulsion.

Harappan Civilisation

- A flourishing civilization emerged on the banks of the river Indus in the second half of the third millennium BCE and spread across large parts of western India.
- A marked feature of this ancient civilization was the vivid imagination and artistic sensibilities exuded by the numerous sculptures, seals, potteries, jewellerys found at the excavation sites.
- **Harappa and Mohenjo-daro – the two major sites of this civilization** – are among the earliest and finest examples of urban civic planning. The planned network of roads, houses and drainage systems indicate the planning and engineering skills that developed during those times.
- Some of the important sites of the Indus Valley civilization and their archaeological findings are:
 - **Harappa in present Pakistan** – granaries with big platform, stone symbol of lingam and yoni, mother goddess figure, wheat and barley in wooden mortar, dice, copper scale and mirror.
 - **Mohenjo-daro in present Pakistan** - bronze dancing girl, the sculpture of bearded priest, the great bath, the great granary.
 - **Dholavira in Gujarat** – giant water reservoir, unique water harnessing system, stadium, dams and embankments, inscription comprising 10 large sized signs like an advertisement board.
 - **Lothal (Manchester of Indus Valley Civilisation) in Gujarat** – dockyard, double burial, risk husk, fire altars, painted jar, modern day chess, terracotta figure of ship, instruments for measuring 45, 90 and 180-degree angles.
 - **Ropar in Punjab** – dog buried with human oval pit burials.
 - **Balathal and Kalibangan in Rajasthan** – bangle factory, toy carts, bones of camel, decorated bricks, citadel and lower town.
 - **Banawali in Haryana** – toy plough, barley grains, oval-shaped settlement, the only city with radial streets.
 - **Alamgirpur in Uttar Pradesh** – impression of a cloth on a trough.