Syllabus subtopic: Science and Technology- developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology.

Prelims and Mains focus: about the findings of the study and their significance

News: A recent study by researchers at Indian Institute of Technology, Kharagpur (IITKGP) has revealed that abrupt changes in the Indian monsoon in the last 900 years decided the course of human history in the sub- continent.

Context: A paper titled “Abrupt changes in Indian summer monsoon strength during the last 900 years and their linkages to socio-economic conditions in the Indian subcontinent” by Anil K. Gupta, professor at the geology and geophysics department of IITKGP, highlights that decline of Indian dynasties was linked to weak monsoon and reduced food production.

Findings on the study

- Several dynasties, such as the Sena in Bengal, Solanki in Gujarat in the mid-13th century and Paramara and Yadav in the early to mid-14th century – all of which flourished during abundant rainfall — declined during the dry phases of Indian summer monsoon (ISM), suggesting role of the climate in the socio-political crisis, the study revealed.

- Deficient rainfall led to the collapse of the Mansabdari system, started by Mughal emperor Akbar, in the late 17th century. Similarly, drought interspersed with violent monsoon rains sounded the death knell for the Khmer empire of south-east Asia in the 15th century.

- The paper published in international journal PALEO 3 highlights three phases in the 900 year stretch — Medieval Climate Anomaly from 950 CE to 1350 CE, Little Ice Age from 1350 CE to 1800 CE and Current Warm Period from 1800 CE till today. The paper highlights strong monsoon during Medieval Climate Anomaly and Current Warm Period and phases of weak and strong monsoon in Little Ice Age.
For the study on long-term spatio-temporal variability of the ISM, a group of researchers, which also included experts from Wadia Institute of Himalayan Geology, looked at palaeoclimatic records using oxygen isotope proxy record from **speleothems (a structure formed in a cave by deposition of minerals from water)** at the Wah Shikar cave in Meghalaya.