



News Analysis (03 May, 2021)

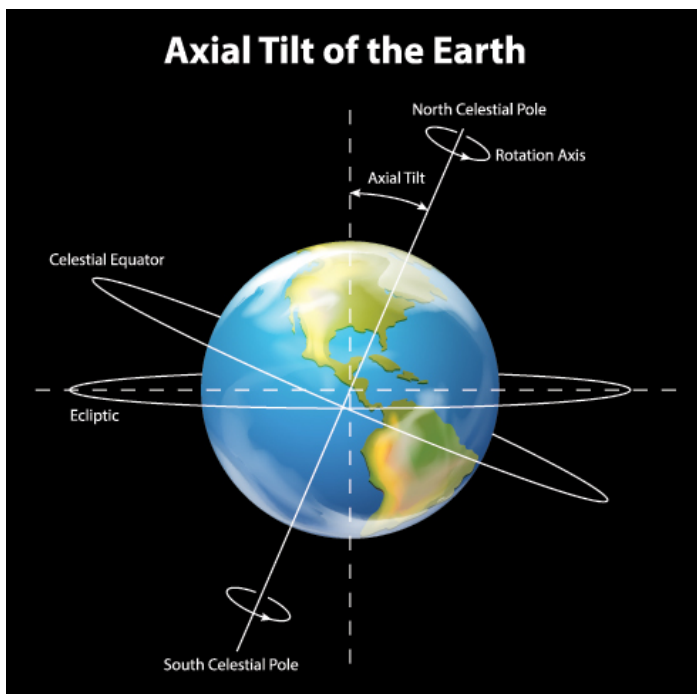
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Climate Change Causing Shift in Earth's Axis

Why in News

A study published in Geophysical Research Letters of the American Geophysical Union (AGU) says that **due to the significant melting of glaciers** because of global temperature rise, **Earth's axis of rotation has been moving more than usual** since the 1990s.

While this change is **not expected to affect daily life**, it can **change the length of the day by a few milliseconds**.



Key Points

- **Earth's Axis of Rotation:**

- It is the **line along which it spins around itself** as it revolves around the Sun. **Earth's axial tilt** (also known as the obliquity of the ecliptic) is about **23.5 degrees**. Due to this axial tilt, the sun shines on different latitudes at different angles throughout the year. This **causes the seasons**.
- The **points** on which the **axis intersects the planet's surface** are the **geographical north and south poles**.
 - The **location of the poles is not fixed**. The **axis moves** due to **changes in how the Earth's mass is distributed** around the planet. Thus, the **poles move when the axis moves**, and the movement is called "**polar motion**".
 - Generally, polar motion is **caused by** changes in the hydrosphere, atmosphere, oceans, or solid Earth. But now, climate change is adding to the degree with which the poles wander.
- According to NASA, data from the **20th century** shows that the **spin axis drifted about 10 centimetres per year**. Meaning over a century, **polar motion exceeds 10 metres**.

- **Findings from the New Study:**

- Since the **1990s, climate change has caused billions of tonnes of glacial ice to melt** into oceans. This has **caused the Earth's poles to move in new directions.**
- The **north pole has shifted in a new eastward direction** since the 1990s, **because of changes in the hydrosphere** (meaning the way in which water is stored on Earth).
- From 1995 to 2020, the average speed of drift was **17 times faster** than from 1981 to 1995.
- Also, in the last four decades, the **poles moved by about 4 metres in distance.**
- The calculations were based on satellite data from **NASA's Gravity Recovery and Climate Experiment (GRACE) mission.**
- **Causes of Polar Drift:**
 - **Ice Melting:**
 - The faster ice melting under global warming was the most likely cause of the directional change of the polar drift in the 1990s.
 - As glaciers melt, water mass redistributes, causing shifts in the planet's axis.
 - **Change in Non-Glacial Regions (Terrestrial Water Storage):**
Due to climate change and unsustainable consumption of groundwater for irrigation and other anthropogenic activities.
 - **Groundwater Depletion:**
As millions of tonnes of water from below the land is pumped out every year for drinking, industries or agriculture, most of it eventually joins the sea, thus redistributing the planet's mass.

Source: IE

Covid-19 and Neanderthal Genomes

Why in News

Evolutionary biologists from different countries have shown that the **regions of host genomes that increase the risk of getting severely ill and protect against the SARS-CoV-2 virus were inherited from Neanderthals.**

Neanderthals are **an extinct species of hominids** that were the closest relatives to modern human beings.

Key Points

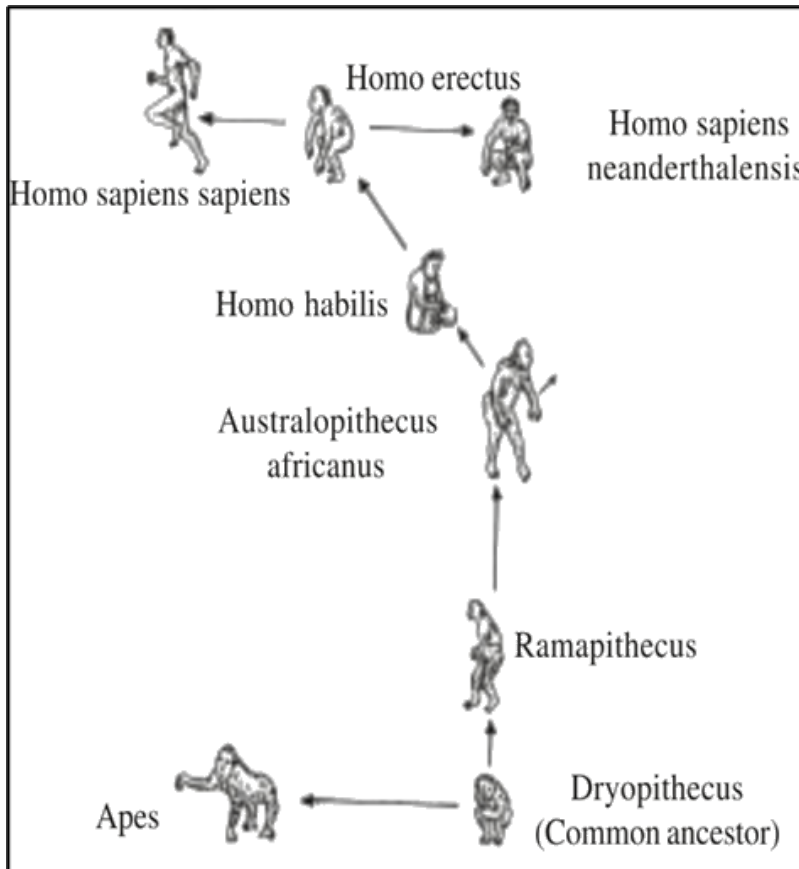
- **Findings:**
 - A region on **host chromosome 3** acts as a **significant genetic risk factor towards getting seriously ill** and, at the same time, a **group of genes on chromosomes 6,12,19, and 21 protect us against the virus.**
 - Modern day **humans share a stretch of 50,000 nucleotides** (nucleotides are the basic building blocks of DNA) **in chromosome 3 with Neanderthals.**
 - About **50% of South Asians carry the region in chromosome 3 from Neanderthal genomes**, the same region that makes us more prone to getting severely sick with the virus.
 - A part of **host chromosome 12**, previously shown to protect against the virus, also was **inherited from Neanderthal genomes.**
 - Nearly **30% of South Asians bear the chromosome 12 region.**
- **Importance:**
 - Viruses can only survive and multiply in host cells. Therefore, understanding the host genome is **paramount to studying both susceptibility and protection against the virus** in a given population.
 - While specific genes from Neanderthals are working against the virus and protecting us from getting a severe disease, others are associated with an increased risk of getting critically ill. This push and pull effect **may be one of the intriguing facts about how the selection of genes happens during evolution.**

Human Evolution

- Human evolution is the evolutionary process that led to the emergence of anatomically modern humans, beginning with the evolutionary history of primates—in particular genus Homo—and leading to the emergence of Homo sapiens as a distinct species of the hominid family, the great apes.
- **Stages of Evolution of Human:**
 - Dryopithecus
 - Ramapithecus
 - Australopithecus
 - Homo
 - Homo habilis
 - Homo erectus
 - Homo sapiens
 - Homo sapiens neanderthalensis
 - Homo sapiens sapiens

- **Neanderthals:**

Neanderthal (*Homo neanderthalensis*, *Homo sapiens neanderthalensis*) is **member of a group of archaic humans who emerged at least 2,00,000 years ago during the Pleistocene Epoch** (about 2.6 million to 11,700 years ago) and were **replaced or assimilated by early modern human populations** (*Homo sapiens*) between 35,000 and perhaps 24,000 years ago.



Genome

- A genome is all the genetic matter in an organism. It is **defined as an organism's complete set of Deoxyribose Nucleic Acid (DNA)**, including all of its genes.
- In humans, a copy of the entire genome contains more **than 3 billion DNA base pairs**.

Chromosomes

- In the nucleus of each cell, the **DNA molecule** is packaged into **thread-like structures called chromosomes**.
- Each chromosome is made up of DNA tightly coiled many times around proteins called **histones** that support its structure.
- In **humans**, each cell **normally contains 23 pairs of chromosomes**, for a total of 46.

- Twenty-two of these pairs, called **autosomes**, look the same in both males and females.
- The **23rd pair**, the sex chromosomes, differ between males and females. Females have two copies of the X chromosome, while males have one X and one Y chromosome.

Source: TH

Nomenclature & Classification of Corona Variants

Why in News

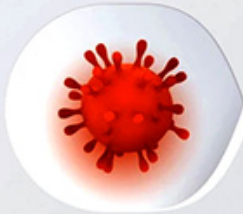
Recently, India's Health Ministry said that a new **double mutant variant** of the **coronavirus** had been detected in addition to many other strains or **Variants of Concern (VOCs)** found in 18 states in the country.

Key Points

Virus Variant:

- Variants of a virus have **one or more mutations that differentiate it from the other variants** that are in circulation. While most mutations are deleterious for the virus, **some make it easier for the virus to survive.**
- The **SARS-CoV-2** (Corona) virus is **evolving fast because of the scale at which it has infected people around the world.** High levels of circulation mean it is easier for the virus to change as it is able to replicate faster.
- The **original pandemic virus (founder variant) was Wu.Hu.1** (Wuhan virus). In a few months, variant **D614G** emerged and became globally dominant.

The mutating coronavirus SARS-CoV-2 has spawned several variants that have scientists worried. Here's a lowdown on those detected in India's exploding second wave



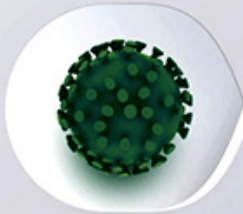
B.1.1.7 UK variant

- Between 40 and 70% more infectious than other variants
- Raises death risk by about 60%
- Vaccines seem to work against it



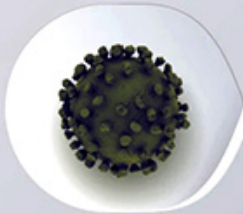
P1 Brazil variant

- More contagious than the initial coronavirus strain, can re-infect
- May be more virulent but further research needed
- E484K, 'escape mutation', helps the virus dodge antibodies



B.1.351 South Africa variant

- Found in at least 20 countries, including the UK
- Mutation called N501 appears to make it more contagious
- Another mutation, called E484K, could help virus dodge a person's immune system and may affect how vaccines work



B.1.617 Double Mutant

- E484Q mutation is similar to another variant, the E484K, found in fast-spreading Brazil and South Africa regions
- Includes L452R mutation, which helps the virus escape our body's natural immune response
- This variant has been detected in at least 10 other countries, including the US, the UK, Australia, and New Zealand

- **Classification:**

- The **US Centers for Disease Control and Prevention (CDC)** classifies variants into three categories:

- **Variant of Interest (VOI):**

- A variant with specific genetic markers that have been associated with **changes to receptor binding, reduced neutralization by antibodies** generated against previous infection or vaccination, **reduced efficacy of treatments, potential diagnostic impact, or predicted increase in transmissibility or disease severity.**
- An example of VOI is the **B.1.617 variant** of the virus which has **two mutations**, referred to as **E484Q and L452R.**

This variant is classified as a **VOI** by the **World Health Organization (WHO)** as well.

- Both are separately found in many other coronavirus variants, but they have been **reported together for the first time in India.**

- **Variant of Concern (VOC):**

- A variant for which there is **evidence of an increase in transmissibility, more severe disease** (e.g., increased hospitalizations or deaths), **significant reduction in neutralization by antibodies** generated during previous infection or vaccination, **reduced effectiveness of treatments or vaccines, or diagnostic detection failures.**

- The **B.1.1.7 (UK variant), B.1.351 (South Africa Variant), P.1 (Brazil Variant), B.1.427, and B.1.429** variants circulating in the US are classified as VOCs.

- **Variant of High Consequence:**

- A variant of high consequence has **clear evidence that prevention measures or medical countermeasures have significantly reduced effectiveness** relative to previously circulating variants.
- So far, the CDC has **not found variants of high consequence in circulation in the US.**

- **Variants Under Investigation (VUI):**

- **Public Health England (PHE)** says that if the variants of SARS-CoV-2 are considered to have **epidemiological, immunological or pathogenic properties**, they are raised for formal investigation.
- At this point, the variants emerging from the **B.1.617 lineage are designated as VUI.**

- **Nomenclature:**
 - **Phylogenetic Assignment of Global Outbreak Lineages (PANGOLIN):**
 - It was developed to implement the dynamic nomenclature of SARS-CoV-2 lineages, known as the Pango nomenclature.
 - It **uses a hierarchical system based on genetic relatedness** – an invaluable tool for genomic surveillance.
 - It **uses alphabets (A, B, C, P) and numerals starting with 1**. Variant lineages are at the emerging edge of the pandemic in different geographies. **Lineage B is the most prolific.**
- **Concerns Related to Different Variants:**
 - **Increased Transmission:**

In many countries, including India, variants, **by virtue of increased transmissibility**, have kicked off new wave(s) of epidemic transmission.
 - **Increased Severity:**

Regarding virulence (propensity to cause severe/life-threatening disease), the **UK variant is worse**. The South Africa and Brazil variants do not seem to have higher virulence.
 - **Lowered Immunity:**
 - The third concern is regarding the immunity cover offered by vaccination using antigens made from **D614G variant** – which applies to most vaccines in current use.
 - **Lowered efficacy of vaccines** was found more with the South African and less with the Brazil variant. Hence, reinfection can occur in spite of immunity by earlier **D614G** infection or vaccination.
 - Vaccine efficacy may be lower now than what was determined in phase-3 trials as VOC were not then widely prevalent.
 - Fortunately, **mRNA vaccines** have broader immunity for different reasons, and they protect better against these two variants.
- **Possible Solution:**
 - Karolinska Institute in Sweden has created an antigen using new variant RBD (Receptor Binding Domain) peptide with adjuvant, and inoculated monkeys already primed with an older vaccine.
 - A RBD is a short immunogenic fragment from a virus that binds to a specific endogenous receptor sequence to gain entry into host cells.
 - An adjuvant is a substance that enhances the immune system's response to the presence of an antigen.
 - The resultant booster response was not only high but also broad, **covering new variants**. This approach, called '**hetero boosting**' by a different vaccine, **offers a way to manage the 'vaccine-escape' variants until newer vaccines become available.**

- The **pandemic** has shown the **critical importance of biomedical research and capacity building** – for saving lives and economic growth.
- We **need a foundation of broad-based research**, in universities, medical colleges and biotechnology companies, **all of which must be funded, encouraged, appreciated, and talent rewarded.**
- While some endeavours have been initiated, they must take off in a big way, and **India must invest heavily in biosciences. After a decade, its products and profit will make us healthier and wealthier.**

Source: IE

Asian Development Outlook 2021: ADB

Why in News

According to the report **Asian Development Outlook (ADO) 2021**, the **second wave of Covid-19 can put India's economic recovery at "risk"**.

ADO is a series of annual economic reports on the Developing Member Countries (DMCs) of the Asian Development Bank (ADB).

Key Points

- **GDP Projections:**
 - **For India:**
 - **Gross Domestic Product (GDP) will rebound strongly by 11% in Fiscal Year (FY) 2021-22** due to continued economic recovery boosted by increased public investment, vaccine rollout, and a surge in domestic demand.
 - **India's economic growth to moderate to 7% in FY 2022-23.**
 - **The economy is expected to have contracted by 8% in FY 2020-21** in line with the **government's second advance estimate.**
 - **For Developing Asia:**
 - **The economic growth is set to rebound to 7.3% in 2021-22.** This follows a **0.2% contraction last year.**
 - **Developing Asia** comprises **46 members of ADB list** on the basis of geographic group.
 - These include **new industrialized economies, countries in Central Asia, East Asia, South Asia, Southeast Asia** and the Pacific.
 - **India is also part of Developing Asia.**

- **Challenges:**
 - **Pandemic** remains the **biggest risk** for the region (Developing Asia) as potential delays in vaccine rollouts or significant new outbreaks could undermine growth.
 - Increasing **geopolitical tensions, production bottlenecks, financial turmoil** from tightening financial conditions, and long-term scarring like **learning losses due to school closures** are among other risk factors.
- **Costs of Pandemic-induced School Closures:**
 - Countries are **using distance learning**, but this is **only partially effective** as **many students lack access to computers and the internet**.
 - These disruptions **will affect the skills** students acquire and, eventually, **their productivity and earnings as future workers**.
 - **Learning losses** range from **8% of a year of learning in the Pacific**, where schools have mostly stayed open, to **55% in South Asia**, where school closures have been longest.
 - The **present value of students' future earning reductions** is estimated at USD 1.25 trillion for developing Asia, equivalent to 5.4% of the region's GDP in 2020.
- **Analysis for India:**
 - Increased **government expenditure on health care, water, and sanitation** will **strengthen the country's resilience against future pandemics**.
 - **Private investment** is expected to pick up on improving sentiment and risk appetite, as well as **accommodative credit conditions** (i.e. making money less expensive to borrow and encouraging more spending).
 - **Domestic demand** is expected to remain the **main driver of growth**.
A faster **vaccine rollout** will **boost urban demand** for services, while the **rural demand will be boosted by robust agriculture growth** and continued government support to farmers by expanding irrigation, improving value chains, and increasing farm loan limits.
 - The government's push to the **manufacturing sector** through the **production-linked incentive scheme** will expand domestic production and help integrate domestic manufacturing with global supply chains.

Gross Domestic Product

- **GDP** is a **measure of economic activity** in a country. It is the **total value of a country's annual output of goods and services**. It gives the economic output from the consumers' side.
- $GDP = \text{Private consumption} + \text{Gross investment} + \text{Government investment} + \text{Government spending} + (\text{exports} - \text{imports})$

Asian Development Bank

- **ADB is a regional development bank established in 1966.**
- It has **68 members. India is a founding member.**
49 are from within Asia and the Pacific and 19 outside.
- It **aims** to promote social and economic development in Asia and the Pacific.
- As of 31st December 2019, **ADB's five largest shareholders** are **Japan** and the **United States** (each with 15.6% of total shares), the People's Republic of **China** (6.4%), **India** (6.3%), and **Australia** (5.8%).
- It is **headquartered in Manila, Philippines.**

Source: DTE

Core Sector Output

Why in News

The **eight core sectors grew by 6.8% in March 2021** (the **highest in 32 months**), after a **3.8% dip in February**, but the **spike was largely due to the base effects from March 2020.**

During **2020-21** (April-March), output of the **eight sectors contracted by 7%** as against a positive growth of 0.4% in 2019-20.

Key Points

- **About Eight Core Sectors:**
 - These comprise **40.27% of the weight** of items included in the **Index of Industrial Production (IIP).**
 - The eight core sector industries **in decreasing order of their weightage: Refinery Products > Electricity > Steel > Coal > Crude Oil > Natural Gas > Cement > Fertilizers.**
- **Base Effect:**
 - The base effect **refers to the effect that the choice of a basis of comparison or reference can have on the result** of the comparison between data points.
 - **For example,** the base effect **can lead to an apparent under- or overstatement of figures such as inflation rates or economic growth rates** if the point chosen for comparison has an unusually high or low value relative to the current period or the overall data.
 - Production of natural gas, steel, cement and electricity jumped 12.3%, 23%, 32.5% and 21.6% in March 2021, as against (-) 15.1%, (-) 21.9%, (-) 25.1% and (-) 8.2% in March 2020, respectively (**low base effect**).

- **Index of Industrial Production:**

- **IIP** is an indicator that **measures the changes in the volume of production of industrial products** during a given period.
- It is compiled and published monthly by the **National Statistical Office (NSO), Ministry of Statistics and Programme Implementation.**
- It is a **composite indicator** that measures the growth rate of industry groups classified under:
 - **Broad sectors**, namely, Mining, Manufacturing, and Electricity.
 - **Use-based sectors**, namely Basic Goods, Capital Goods, and Intermediate Goods.
- **Base Year** for IIP is **2011-2012.**
- **Significance of IIP:**
 - It is used by government agencies including the Ministry of Finance, the Reserve Bank of India, etc, **for policy-making purposes.**
 - IIP remains **extremely relevant for the calculation of the quarterly and advance GDP (Gross Domestic Product) estimates.**

Source: TH

Xylophis deepaki

Why in News

A tiny snake “**Xylophis deepaki**” has been **named in honour of Indian herpetologist Deepak Veerappan** for his contribution in erecting a new subfamily **Xylophiinae** to accommodate wood snakes.

The **common name suggested** for the species is '**Deepak’s wood snake**'.



Key Points

- **About Xylophis deepaki:**
 - It is a **tiny snake of just 20 cm length** with **iridescent scales**.
 - It was first found on a **coconut plantation** in **Kanyakumari**.
 - It is now reported to be an **endemic species** of **Tamil Nadu** and also been sighted in some parts of the **southern Western Ghats**.
It is found in the **drier regions** and in **lower altitudes** around **Agasthyamalai hills**.
- **About Xylophis:**
 - It is a **small genus of snakes in the family Pareidae**.
 - It **has five species**, all of which are **endemic to the Western Ghats** in southern India.
Five Species: Xylophis Captaini, Xylophis deepaki, Xylophis Mosaicus, Xylophis Perroteri and Xylophis Stenorhynchus.
 - These five species constitute the **monotypic subfamily Xylophiinae**.
They are the **only pareidae** snakes found in India and the only snakes in the family found outside Southeast Asia.
- **About Wood Snakes:**
 - These are **harmless (non-venomous), sub-fossorial** and often found while digging soil in farms and under the logs in the **Western Ghat forests**.
 - They feed on **earthworms** and possibly other **invertebrates**.
 - Their close relatives are found in **Northeast India** and **Southeast Asia** and are known to be **arboreal** (living in trees).
- **Related Information :**
 - According to the **IUCN Red List of Threatened Species**, **12% of assessed snake species** are listed as **threatened** and their populations are in **decline**.
 - Each year, **2.7 million** people around the world suffer a serious **snakebite envenomation**. The **World Health Organization (WHO)** classified **snakebite** as a **neglected tropical disease** to reduce snakebite in developing countries.
 - **Save The Snakes** is a **dedicated initiative** exclusively for **snake conservation** and **human-snake conflict mitigation**.

Agasthya Hills

- Agasthya hill is a 1,868-metre tall peak within **Neyyar Wildlife Sanctuary**, in the **Western Ghats of Kerala**. The peak lies on the border of Kerala and Tamil Nadu. This peak is a part of the **Agasthyamala Biosphere Reserve**.
- The peak is named after Hindu sage Agastya, who is considered to be one of the seven rishis (Saptarishi) of Hindu Puranas. It is a pilgrimage centre for devotees.
- The **Thamirabarani River** is a **perennial river** which originates from the eastern side of the range and flows into the Tirunelveli district of Tamil Nadu.
- Agasthyamala Biosphere Reserve is listed on **UNESCO World Network of Biosphere Reserves (2016)**.

State Disaster Response Fund

Why in News

Recently, the Centre has released the **first instalment of the State Disaster Response Fund (SDRF) to States**, in the wake of the **second wave of Covid-19** that has claimed thousands of lives since April 2021.

Normally, the first instalment is released in June as per the recommendations of the **Finance Commission**.

Key Points

- **About:**

- SDRF has been constituted under Section 48 (1) (a) of the **Disaster Management Act, 2005**.

It was constituted based on the recommendations of the **13th Finance Commission**.

- It is the **primary fund available with the State governments** for responses to notified disasters to meet expenditure for providing immediate relief.
- It is audited by the **Comptroller and Auditor General of India (CAG)** every year.

- **Contribution:**

- The **Centre contributes 75% of the SDRF allocation for general category States** and Union Territories and **90% for special category States** and Union Territories (northeastern States, Sikkim, Uttarakhand, Himachal Pradesh, Jammu and Kashmir).
- The annual Central contribution is **released in two equal installments as per the recommendation of the Finance Commission**.

- **Disaster (s) Covered under SDRF:**

Cyclone, drought, **earthquake**, fire, **flood**, **tsunami**, hailstorm, **landslide**, avalanche, cloudburst, pest attack, frost and **cold waves**.

- **Local Disasters:**

A **State Government may use up to 10% of the funds** available under the SDRF for providing immediate relief to the victims of **natural disasters that they consider to be ‘disasters’ within the local context** in the State and which are not included in the notified list of disasters of the Ministry of Home Affairs.