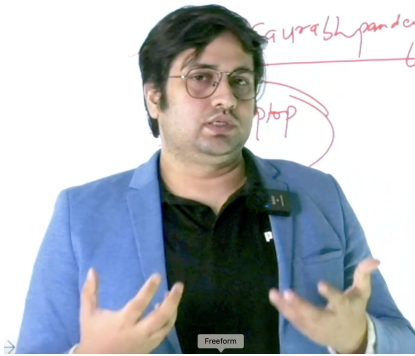
# Topics - MINDS MAPS included

- Tax Terrorism
- Sucralose
- Earthquake and river course
- Sand dike
- D-state
- Optically Stimulated Luminescence (OSL
- Cryoconite
- Poverty line
- The International Criminal Court (ICC)
- Mains





By saurabh Pandey

THE HINDU

# Target Mains -2024/25 -

**Q ‘’Earthquakes will impact human civilisation along river’’ Elaborate**

# Topic- Tax Terrorism

the term could be used colloquially or by certain groups to describe aggressive or abusive tax practices that are perceived as unfair, coercive, or intimidating.

In a broader sense, "tax terrorism" might refer to:

**Aggressive Tax Enforcement:** This could include overly aggressive tax audits, disproportionate penalties, or the use of excessive force or intimidation by tax authorities.

**Double Taxation or Overlapping Tax Jurisdictions:** When individuals or businesses are subject to taxation in multiple jurisdictions without proper relief, it can lead to significant financial burden and be perceived as unfair or punitive.

**Politically Motivated Taxation:** Imposing taxes or changing tax laws for political reasons, such as targeting specific individuals or businesses for political gain, rather than for legitimate fiscal or economic purposes.

# Topic- Sucralose

- **A recent study from India examining the effects of replacing sucrose or table sugar with an artificial sweetener, sucralose, in coffee and tea, found no adverse impact on glucose or HbA1c levels, and in fact indicated a slight improvement in body weight, waist circumference and body mass index (BMI).**

- Sucralose is a synthetic, non-caloric artificial sweetener.
- It is approximately 600 times sweeter than sugar, making it a popular choice for use in a variety of food and beverage products as a sugar substitute.
- Sucralose is produced by chlorinating sucrose, a process that replaces three hydroxyl groups with chlorine atoms.

## Key points about sucralose include:

**Zero Calories:** Sucralose does not provide calories when consumed, making it an attractive option for those looking to reduce their calorie intake.

**Stability:** It is heat-stable and does not break down when exposed to high temperatures, which means it can be used in baking and cooking.

**Digestion**: Sucralose is not metabolized by the body, and most of it is excreted unchanged in the feces. Only a small amount is absorbed into the bloodstream and is eventually excreted in the urine.

**Safety:** Sucralose has been extensively studied and is generally recognized as safe (GRAS) by the U.S. Food and Drug Administration (FDA) and other regulatory agencies worldwide. It has been approved for use in over 100 countries.

**Environmental Impact:** There has been some concern about the environmental impact of sucralose, particularly its persistence in water sources. It is not effectively removed by conventional water treatment methods, and its long-term effects on aquatic ecosystems are still being studied.

**Use in Products:** Sucralose is used in a wide range of products, including soft drinks, tabletop sweeteners, baked goods, ice cream, and other desserts. It is often marketed under brand names such as Splenda.

**Regulatory Approval:** The approval process for sucralose involved extensive toxicological studies to ensure its safety for human consumption. It was first approved for use in the United States in 1998 and has since been approved for use in many other countries.

While sucralose is considered safe for consumption by regulatory bodies, some individuals may have concerns about the use of artificial sweeteners.

As with any food additive, some people may experience adverse reactions or prefer to avoid it for personal reasons

# Topic-Earthquake and river course

- Researchers found two large sand dikes.
- These were the first proof that earthquakes can move rivers. In June 2024, they reported that an earthquake of magnitude 7 to 8 was responsible for shifting the Ganga more than two millennia ago
- To date these events, a technique called optically stimulated luminescence dating was used.
- This method estimates how long a mineral grain has been buried by measuring the natural radiation stored in it
- The discovery that earthquakes can trigger avulsions suggests they can be far more devastating than previously thought. ‘The impact can be severe for populated regions like the Ganges-Meghna-Brahmaputra delta

# Sand Dikes

- Sand dikes, also known as sand dykes, are geological features that form when sand is injected into fractures or other openings in sedimentary rocks.
- This process, known as sedimentary dike formation, can occur when the sand is under high pressure, often due to tectonic forces or the weight of overlying sediments.
- The sand that forms these dikes can come from various sources, including nearby sandstones or unconsolidated sediments

- These features are of interest to geologists because they can provide insights into the stress conditions and fluid flow within sedimentary basins.
- They can also be important for understanding the diagenetic processes that affect sedimentary rocks and the potential for hydrocarbon traps in oil and gas exploration.
- Sand dikes are not to be confused with coastal dikes, which are human-made structures designed to protect land from flooding by the sea.
- Coastal dikes are part of flood control infrastructure and are not related to the geological features discussed here.

# Optically Stimulated Luminescence (OSL

- Optically Stimulated Luminescence (OSL) dating is a method used to determine the age of sediments, typically ranging from a few decades to about 100,000 years.
- It is particularly useful for dating materials that were once buried but are now exposed, such as those found in archaeological sites or sedimentary deposits that have been eroded and redeposited.
- The basic principle of OSL dating is that when sediments are exposed to sunlight, they accumulate energy from ionizing radiation in the natural environment (from cosmic rays and radioactive decay of elements in the surrounding sediments and rocks).
- This energy is trapped in the lattice structure of certain minerals, such as quartz and feldspar, which are common in sedimentary rocks.

- When these minerals are exposed to light (usually from the sun), the trapped energy is released in the form of luminescence (light).
- The intensity of this luminescence is proportional to the amount of radiation the mineral has been exposed to since it was last exposed to light.
- To date a sediment using OSL, a sample is taken from the site and kept in light-tight conditions to prevent any additional exposure to light.
- In the laboratory, the sample is stimulated with light (usually from a laser or LED), and the resulting luminescence is measured.
- The amount of luminescence is used to calculate the equivalent dose (De), which is the amount of radiation the sample has absorbed since it was last exposed to light.

- The dose rate (Dr) is also measured, which is the rate at which the sample is exposed to radiation in its current environment. The age of the sediment can then be calculated using the formula:
- Age = De / Dr
- OSL dating is a valuable tool in fields such as archaeology, geology, and geomorphology, as it can provide accurate ages for events such as the deposition of sediments, the construction of archaeological features, or the timing of landscape changes.
- It is particularly useful in situations where other dating methods, such as radiocarbon dating, are not applicable or provide insufficient resolution

# Topic- D-state

**Dreams are primarily associated with REM and activated EEG.**

**A combined duration of the REM-EEG condition called the D-state takes up 25% of normal sleep.**

**The D-state depends on an area within the brain stem known as the pontine tegmentum.**

**It is associated with a mechanism involving a chemical called norepinephrine.**

**Other stages of sleep involve another chemical, serotonin, in the brain.**

**The D-state is associated with variability in breathing, heart rate, and relaxation of skeletal muscles and reduction of electrical activity in muscles near the base of the tongue. Research has found dreaming is associated with REM sleep.**

- The term "REM-EEG condition" likely refers to the electroencephalogram (EEG) patterns observed during the rapid eye movement (REM) sleep stage.
- REM sleep is one of the stages of sleep in mammals and birds, and it is characterized by rapid eye movements, increased brain activity (as measured by EEG), and sometimes vivid dreams.
- During REM sleep, the EEG shows a pattern that is similar to the brain activity seen during wakefulness, with mixed-frequency activity that includes theta, alpha, and beta waves.
- This contrasts with the slower, more synchronized delta waves seen in deep non-REM sleep.
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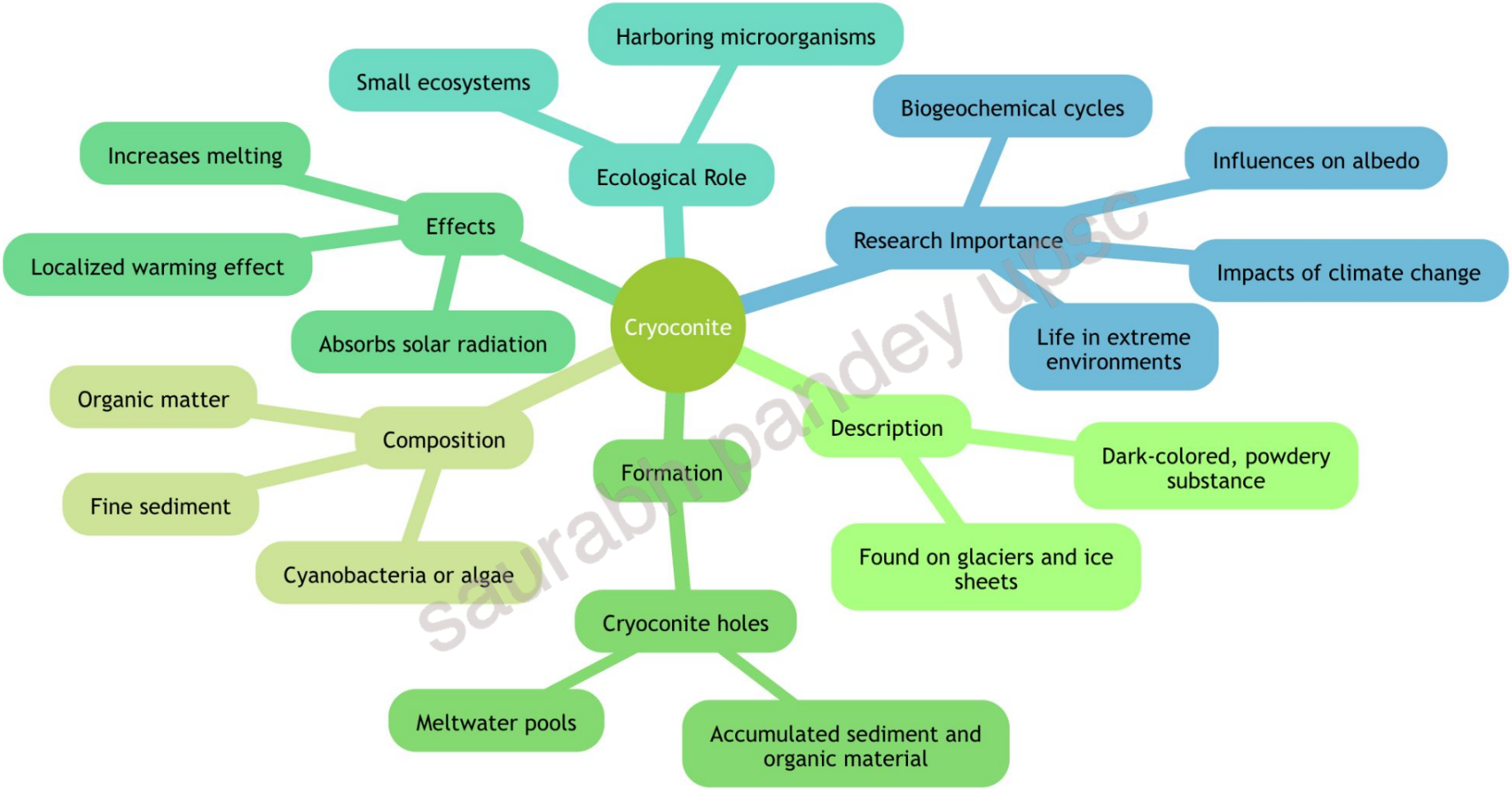
- **The REM-EEG condition can be an important marker for sleep researchers and clinicians, as it helps to identify this distinctive sleep stage.**
- **Monitoring EEG patterns during REM sleep can also be useful in diagnosing sleep disorders and assessing sleep quality.**

# Topic- Cryoconite

- Cryoconite is a dark-colored, powdery substance found on the surface of glaciers and ice sheets.
- It is composed of a mixture of fine sediment, organic matter, and sometimes cyanobacteria or algae.
- Cryoconite forms in small, irregularly shaped holes known as cryoconite holes, which are essentially meltwater pools on the ice surface that have accumulated sediment and organic material.
- The dark color of cryoconite absorbs more solar radiation than the surrounding ice, creating a localized warming effect that increases melting.
- This process contributes to the formation and growth of cryoconite holes, which can act as small ecosystems, harboring a variety of microorganisms.

- Cryoconite plays a role in the ecology of glaciers and ice sheets, and it is also of interest to scientists studying the impacts of climate change on polar and alpine environments.
- The presence of cryoconite can influence the albedo (reflectivity) of ice surfaces, potentially affecting the rate of ice melt and contributing to feedback mechanisms in the climate system.
- Research on cryoconite has implications for understanding the biogeochemical cycles of polar regions and the overall health of glacial ecosystems.
- It is also relevant to the study of life in extreme environments, as the organisms living in cryoconite holes must adapt to the harsh conditions of high UV radiation, low temperatures, and limited nutrients.



# Mapping - Isunnguata Sermia glacier of the Greenland Ice Sheet

# Topic- Poverty line

- In the Indian context, the various committees constituted earlier by the government, including the Lakdawala, the Tendulkar, and the Rangarajan Committees, have defined the poor as the persons below the ‘poverty line’ (PL).
- The PL is a monetary equivalence based on household monthly per capita consumer expenditure (MPCE) that should be sufficient for the household to purchase the food and non-food items included in the poverty line basket (PLB).

- The Lakdawala Committee anchored the PL and the PLB, which included food and non-food items, to calorie norms of 2,400 kcal per capita per day for rural areas and 2,100 kcal per capita per day for urban areas.
- In contrast, the Tendulkar Committee did not anchor the PL to a calorie norm.
- The PL according to Rangarajan Committee is based on ‘certain normative levels of adequate nourishment, clothing, house rent, conveyance and education, and a behaviorally determined level of other non-food expenses’.

- **The methodology of this analysis first derives the average daily per capita calorie requirement (PCCR) for a healthy life based on the recommended energy requirements for Indians of different age-sex-activity categories as per the latest (2020) report of ICMR-National Institute of Nutrition.**
- **The PCCR has been worked out as a weighted average of the calorie requirements of persons in different age-sex-activity categories with corresponding weights as the proportion of estimated persons in these categories as per the Periodic Labour Force Survey, 2022-23.**

- **In the second step, estimated persons are arranged into 20 fractile classes of MPCE (poorest to richest), each comprising five per cent population, with the estimates of average per capita per day calorie intake (PCCI) and average MPCE (food and non-food) derived for each class based on the data of HCES 2022-23.**

figures:

figure 1.1 mindmap:

# Topic- The International Criminal Court (ICC)

The International Criminal Court (ICC) is an intergovernmental organization and tribunal based in The Hague, Netherlands.

It was established in 2002 as a permanent court to prosecute individuals for the most serious crimes of international concern, including genocide, crimes against humanity, war crimes, and the crime of aggression.

The ICC operates under the Rome Statute, which is an international treaty that serves as the court's foundational document.

Countries that become parties to the Rome Statute agree to the jurisdiction of the ICC and to cooperate with its investigations and prosecutions. As of my knowledge cutoff in 2023, over 120 countries are members of the ICC.

Key features of the ICC include:

**Jurisdiction:** The ICC has jurisdiction over crimes committed by nationals of states that are party to the Rome Statute or within the territory of states that are party to the treaty. It can also exercise jurisdiction over crimes committed in states that are not party to the treaty if the United Nations Security Council refers the situation to the ICC.

**Investigation and Prosecution:** The ICC has its own prosecutor who can initiate investigations either on their own initiative or upon referral by a state party or the United Nations Security Council. The court has conducted investigations and prosecutions in various countries, including the Democratic Republic of Congo, Uganda, Sudan, the Central African Republic, Mali, Libya, Ivory Coast, and others.

**Complementarity Principle:** The ICC operates on the principle of complementarity, meaning it will only step in if national judicial systems are unwilling or unable to genuinely investigate or prosecute crimes under the Rome Statute. The court is designed to be a court of last resort and aims to support, not replace, national criminal justice systems.

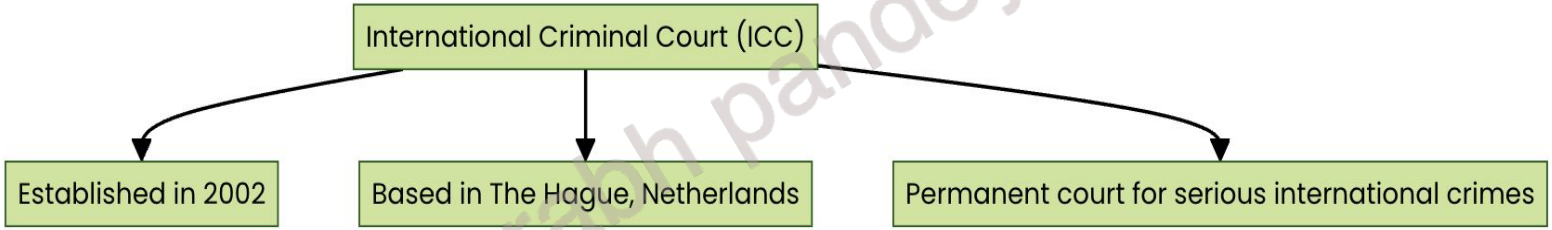
**Independence:** The ICC is independent of the United Nations, although it cooperates with the UN and its member states. It receives funding from the contributions of its member states.

- The ICC has faced criticism and challenges, including accusations of bias against African states, difficulties in securing cooperation from states for arrests and evidence-gathering, and concerns about the effectiveness and fairness of its proceedings.
- Some countries, including the United States, Israel, and Russia, have not ratified the Rome Statute and have been critical of the court's jurisdiction and operations.
- Despite these challenges, the ICC remains an important institution in the international legal system, aiming to ensure that the most serious international crimes do not go unpunished and to provide a measure of justice for the victims of such crimes

## Overview

- **Established in 2002**
- **Based in The Hague, Netherlands**
- **Permanent court for serious international crimes**

**Overview:**

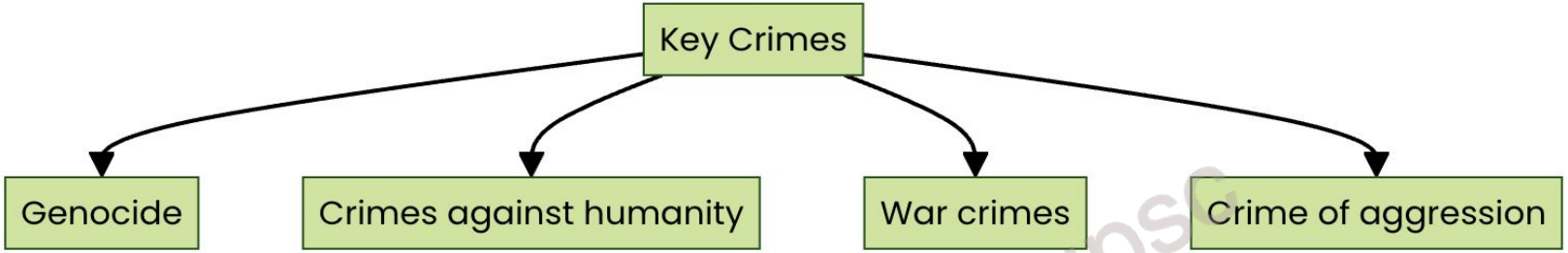





## Key Crimes

- **Genocide**
- **Crimes against humanity**
- **War crimes**
- **Crime of aggression**

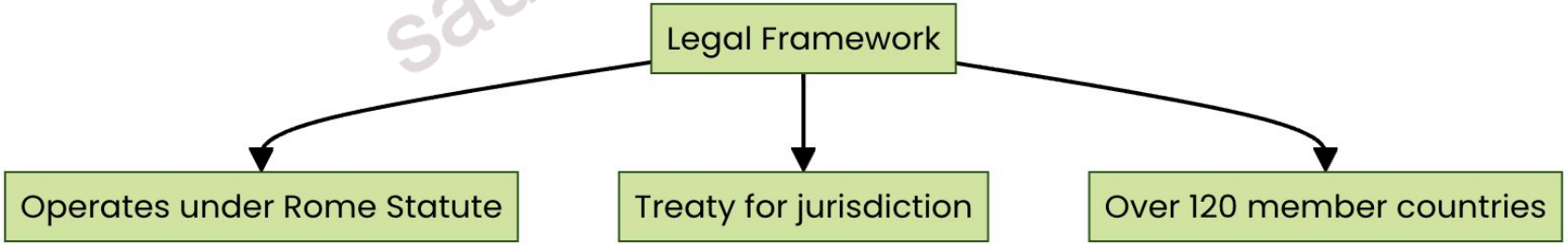
**Key Crimes:**




## Legal Framework

- **Operates under Rome Statute**
- **Treaty for jurisdiction**
- **Over 120 member countries**

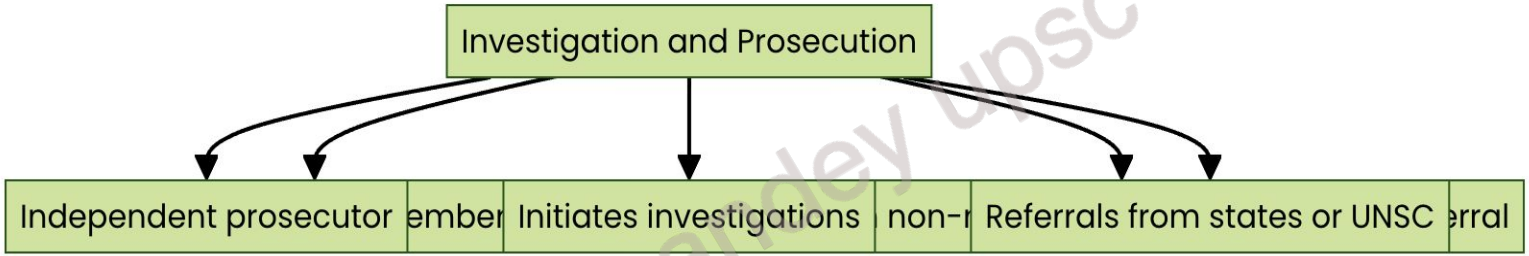
**Legal Framework:**



## Jurisdiction

- Crimes by nationals of member states
- Crimes in non-member states under UNSC referral

**Jurisdiction:**






## Investigation and Prosecution

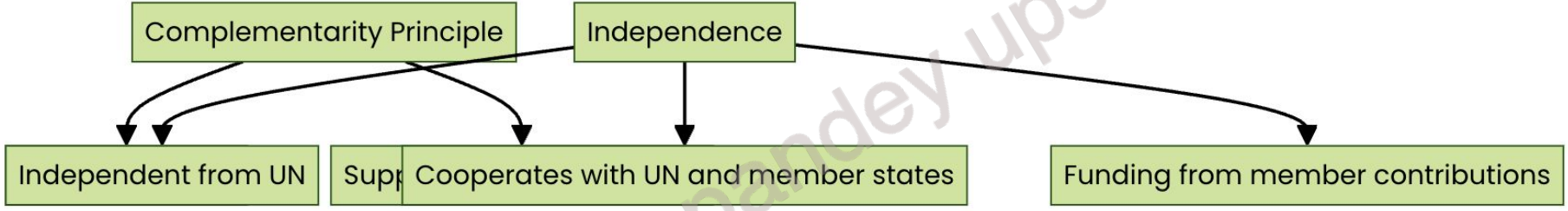
- Independent prosecutor
- Initiates investigations
- Referrals from states or UNSC

**Investigation and Prosecution:**

## Complementarity Principle

- **Last resort court**
- **Supports national systems**

**Complementarity Principle:**






## Independence

- **Independent from UN**
- **Cooperates with UN and member states**
- **Funding from member contributions**

**Independence:**