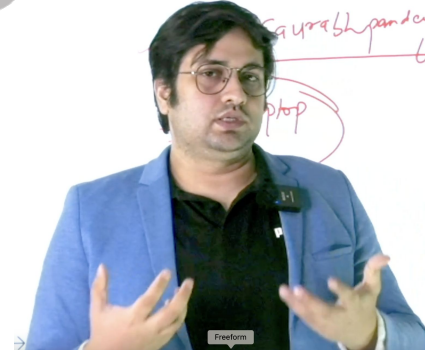


Topics - MINDS MAPS included



- SHe-Box
- LaseR Surgery & Chirped Pulse Amplification (CPA).
- Femtosecond Lasers
- Fixed Dose Combinations
- PM Visit to UKraine
- State election commission
- -BioE3 or Biotechnology for Economy,
- Lateral entry → What is merit versus spoils system?
- Why Fishes Died in Port of Volos, Greece

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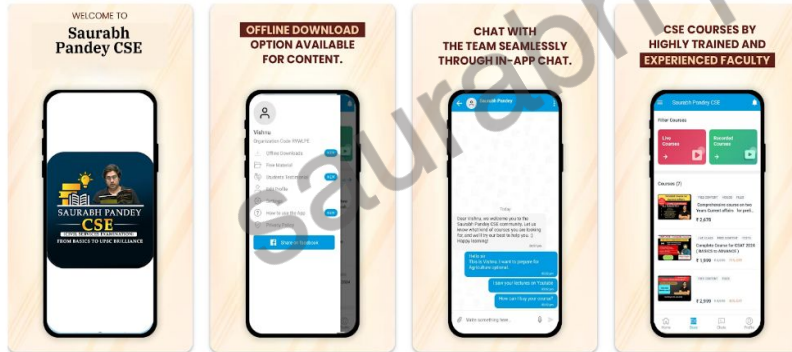
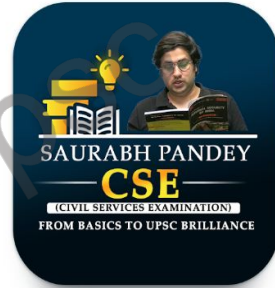
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- **Topic- SHe-Box,**

- **The Union Ministry of Women and Child Development has launched SHe-Box, a centralised portal for registering and monitoring complaints of sexual harassment of women at the workplace.**
- **It serves as a centralised repository of information related to Internal Committees (ICs) and Local Committees (LCs) formed, encompassing both the government and private sectors.**
- **It offers a common platform to file complaints, track their status, and ensure a time-bound processing of complaint by ICs.**
- **It also provides assured redressal of complaints and a streamlined process.**



Topic- Submarine Arighaat

Overview

INS Arighaat: India's second nuclear-powered submarine.

Purpose: Strengthens India's nuclear triad.

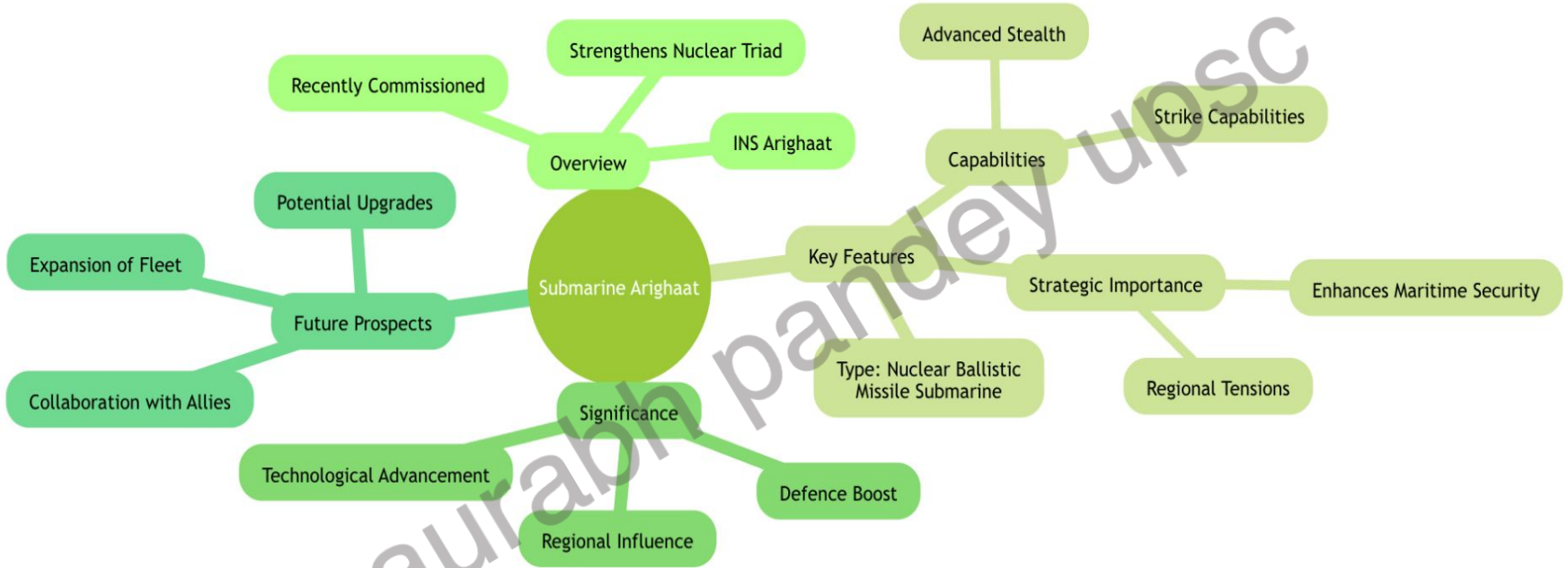
Commissioning: Recently entered service.

Key Features

Type: Nuclear ballistic missile submarine.

Capabilities: Advanced stealth and strike capabilities.

Strategic Importance: Enhances maritime security amid regional tensions.



Topic- LaseR Surgery & Chirped Pulse Amplification (CPA).



The word 'laser' is actually an acronym for 'Light Amplification by Stimulated Emission of Radiation', a phrase that encapsulates the physics underlying this transformative technology.

The fundamental concept of stimulated emission was first introduced by Albert Einstein in 1917.

He theorised that when an electron in an excited state drops to a lower energy level, it can release energy as a photon.

If this photon interacts with another excited electron, it can stimulate the release of a second photon of identical energy, phase, and direction — a process that amplifies light.

It wasn't until 1960, however, this theory was practically realised.

- **Theodore Maiman, a physicist at Hughes Research Laboratories, built the first working laser using a ruby crystal as the gain medium.**
- **The ruby laser emitted light at a specific wavelength (694 nm) in the red part of the spectrum and was the first of its kind to produce a concentrated beam of light with unique properties — coherence, monochromaticity, and the ability to be focused to a very small spot.**

Chirped Pulse Amplification (CPA).

- **This technique revolutionised the field of laser physics.**
- **Working at the University of Rochester, Gérard Mourou and his student Donna Strickland (the third woman to win a Nobel prize in physics) introduced CPA to amplify ultrashort laser pulses without damaging the amplifying material.**
- **Their innovation later earned them the Nobel Prize in Physics in 2018.**

- **CPA allowed for the amplification of laser pulses in a previously-impossible way, opening the door to medical applications requiring extreme precision, such as in eye surgery.**



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Topic- Femtosecond Lasers

Femtosecond Lasers

Definition: Lasers that emit pulses of light on the order of femtoseconds (10^{-15} seconds).

Applications: Used in various fields like medicine, manufacturing, and scientific research.

Advantages

Precision: High accuracy in cutting and shaping materials.

Minimal Heat Affected Zone: Reduces thermal damage to surrounding areas.

Versatility: Applicable across multiple fields and industries.

Challenges

Cost: High initial investment for equipment.

Complexity: Requires skilled operators for effective use.

Material Limitations: Not all materials are suitable for femtosecond laser processing



Topic- Fixed Dose Combinations

Overview

Definition: A fixed-dose combination (FDC) is a formulation that combines two or more active pharmaceutical ingredients in a single dosage form.

Purpose: Enhance efficacy, simplify treatment regimens, and improve patient adherence.

Key Considerations

Regulatory Challenges: Various countries have different regulations regarding FDCs.

Safety and Efficacy: Importance of clinical trials to ensure safety and therapeutic effectiveness.

Market Trends: Growing demand for combination therapies in chronic diseases.

Applications

Cardiovascular Diseases: Preventing atherosclerotic cardiovascular disease.

Infectious Diseases: Treating conditions like tuberculosis and HIV.

Chronic Conditions: Management of diabetes and hypertension.

Recent Developments

Bans and Regulations: Recent bans on certain irrational FDCs due to safety concerns.

Challenges

Adverse Effects: Potential for increased side effects due to multiple active ingredients.

Public Awareness: Educating patients and healthcare providers on the benefits and risks.





Topic- PM Visit to UKraine

- **Historically rooted in non-alignment and strategic autonomy, India's foreign policy has always sought to balance its relationships with global powers and a peaceful negotiation of territorial disputes.**
- **Since the onset of the Russia-Ukraine war in February 2022, India has avoided taking sides, much to the ire of the western states, which have wanted India to condemn the Russian role in the conflict.**



- **This approach is consistent with India's broader strategy of managing complex geopolitical landscapes without compromising its national interests.**
- **India has always advocated respect for the United Nations charter and peaceful settlement of disputes through institutions such as the UN.**

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- **This attempt is also being seen by analysts as putting weight to the already ongoing effort from Global South countries in the negotiation.**
- **India, as one of the prominent members of the Global South, is trying to play its role in achieving peace in this conflict**

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- **European countries, meanwhile, are desperate to see a resolution to the conflict, especially as the war continues to hurt their economies and increases energy security concerns.**
- **With winter approaching, European countries face the prospect of further economic hardship due to energy shortages and inflationary pressures.**
- **A temporary peace, even if not a comprehensive solution, would alleviate some of these challenges and provide breathing room for European policymakers**

- **From Moscow's perspective, India represents the best option for mediation.**
- **The long-standing friendship between Russia and India, forged during the Cold War and maintained through decades of military and economic cooperation, provides a level of trust that would be difficult to replicate with other potential mediators, even not so with China.**

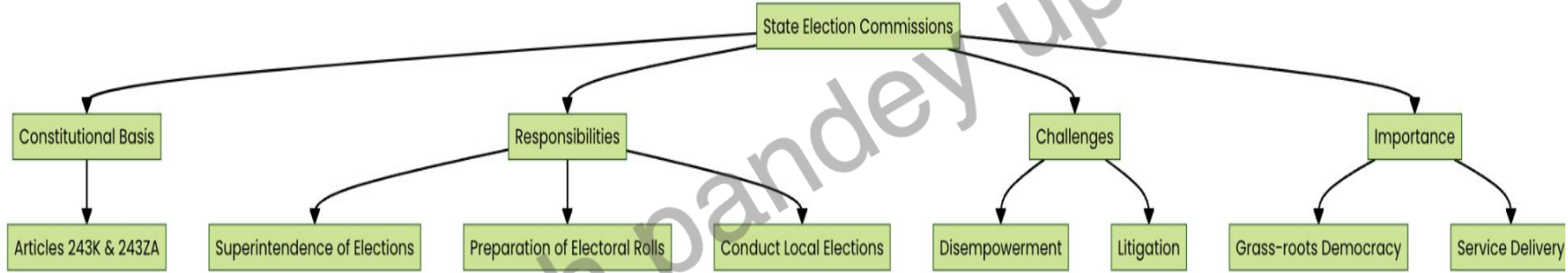
- **Despite the potential benefits of India's involvement, the path to achieving even a temporary peace in Ukraine is fraught with challenges.**
- **Both the parties to the war have taken maximalist positions, with either side refusing to budge from its stand.**
- **The geopolitical interests of the U.S. and Russia are deeply entrenched, and both powers are unlikely to agree on a peace deal proposed by the other.**
- **Moreover, the involvement of various international actors in this war, make any negotiation process highly complicated**



Topic- State election commission

- **The SECs (state election commission) were brought into existence by Articles 243K and 243ZA of the Constitution (introduced by the 73rd and 74th amendments in 1993), which vested them with the superintendence, direction, and control of the preparation of the electoral rolls for, and the conduct of, all elections to panchayats and urban local governments (ULGs).**
- **In reality, however, SECs are increasingly disempowered and, in certain cases, even in litigation with their State governments.**

Conceptual Overview:





- **Regular and fair elections to local governments are non-negotiable for meaningful grass-roots democracy and ensuring effective □ first-mile service delivery in the cities and the villages of the country.**
- **The requirement to conduct elections before the expiry of the □ five-year term of elected local governments is a constitutional mandate and must be as sacrosanct as the elections to the Lok Sabha and Vidhan Sabhas.**
- **To ensure this, SECs must be fully empowered on all matters of local government elections, on a par with the Election Commission of India, as observed by the Supreme Court in Kishan Singh Tomar vs Municipal Corporation of the City of Ahmedabad and Others (2006).**



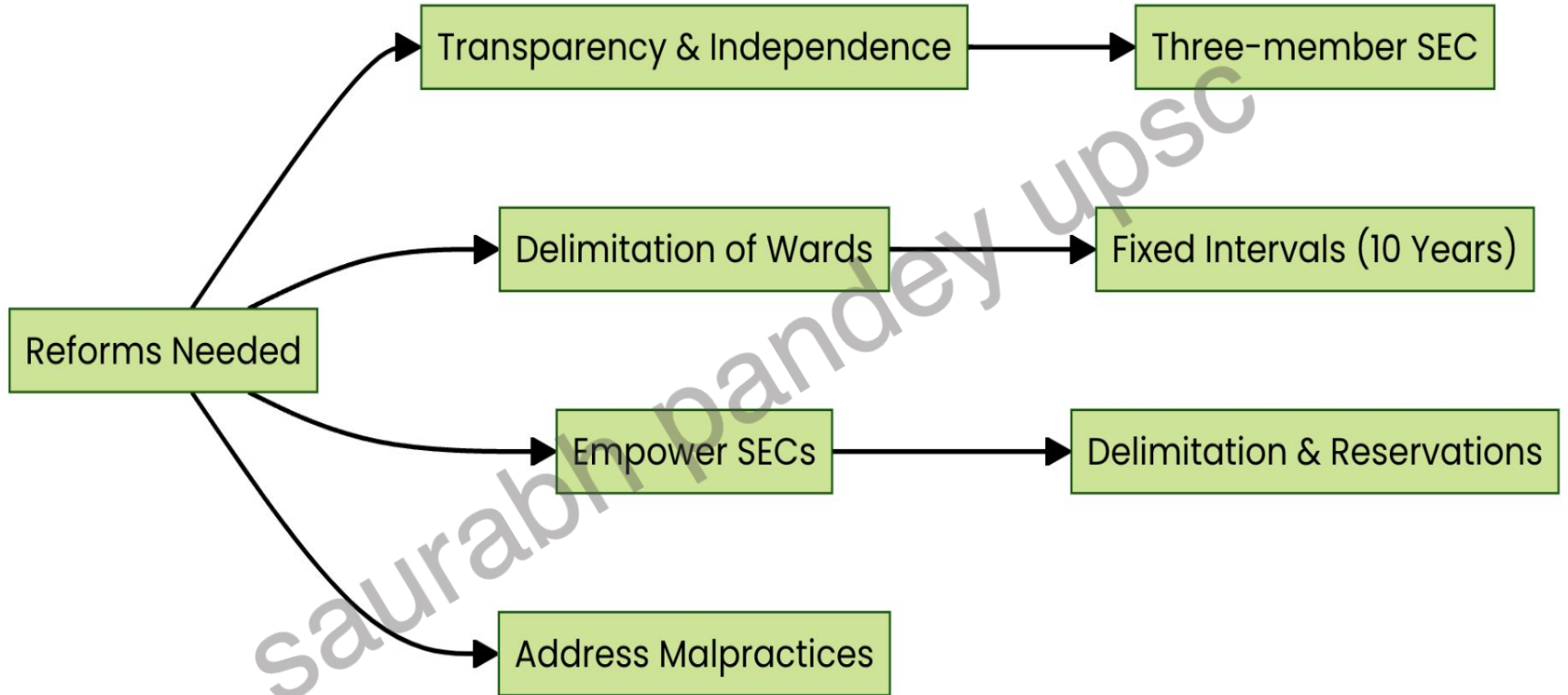
- **The following reforms are a must in order to bring about this change:**
- **First, there is a need to bring SECs on a par with the Election Commission of India in terms of transparency and independence in constitution and appointment.**
- **Notwithstanding the recent dilution in the case of the Election Commission of India, can we not aspire to a three-member SEC which is appointed by a committee that comprises the Chief Minister, Leader of Opposition in the Legislative Assembly (Vidhan Sabha), and the Chief Justice of the High Court?**

- **A State government-appointed SEC is just not working.**
- **The Union government should amend the 74th Constitutional (Amendment) Act in this context.**
- **Second, the delimitation of ward boundaries and reservations of seats must be mandated only at fixed intervals, say once in 10 years.**
- **The absence of this check can lead to State governments acting arbitrarily, causing undue delays in elections to local governments.**
- **Third, the powers of ward delimitation and reservation of seats for local governments must be vested in the SECs.**



- **Further, the SECs must be entrusted with reservations to the positions of mayors/presidents, deputy mayors/vice-presidents of the local governments, say once in 10 years, where applicable.**
- **Elections to these positions are delayed inordinately after local elections as State governments fail to publish the reservation roster to these positions on time.**
- **Finally, malpractices by presiding officers appointed by the State governments have also emerged — an example is the election of the Mayor in the Chandigarh Municipal Corporation Council in 2024.**
- **SECs, therefore, should possibly be entrusted with the election of mayors, presidents, chairpersons, and standing committees.**

Reform Pathways:





Topic -BioE3 or Biotechnology for Economy,

- **Cabinet cleared a proposal, though without specifying a budget, called BioE3 or Biotechnology for Economy, Environment and Employment. Its thrust is to boost manufacturing in the biotechnology sector.**
- **Since 1986, India has had a dedicated department for biotechnology, and which deserves substantial credit.**
- **For instance, the progress in vaccine development, diagnostics and biologicals, that has bolstered India's reputation as a 'vaccine factory', is due to the initiatives of this department.**
- **However, biotechnology did not quite spawn the equivalent of the IT revolution. There is much more to an industrialised biotechnology sector beyond vaccines.**

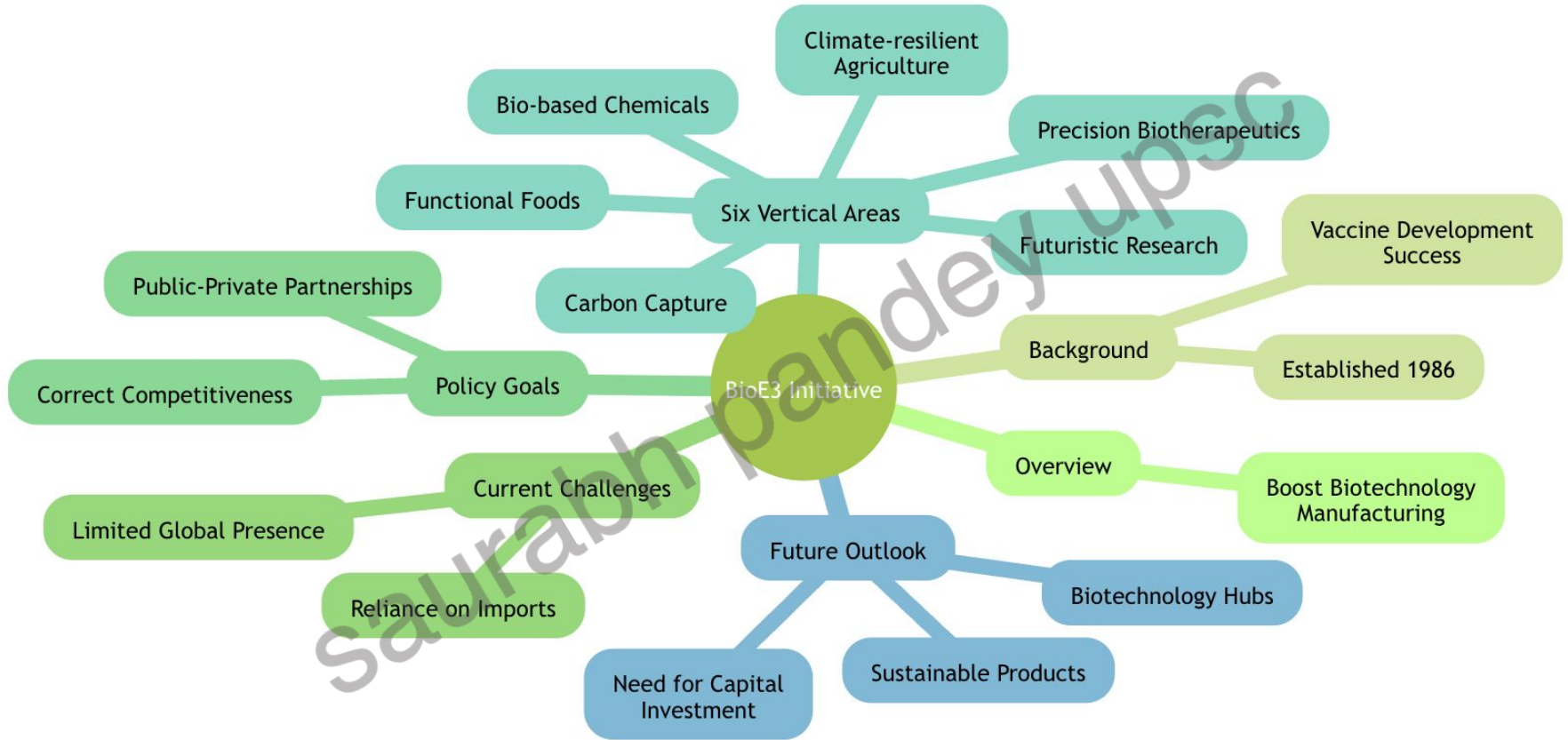


- **There are billiondollar conglomerates today that rest on high-value microbes, gene-modification technologies, bio-plastics, bio-materials, and high-precision medical devices.**
- **However, despite the know-how and human resource capital, only a few Indian biotechs have global resonance, as there are few local manufacturers who can supply Indian laboratories/startups with the ingredients and devices to make products.**
- **The reliance on imports means that India loses its international competitiveness.**



- **The BioE3 policy aims to correct this. In the last four decades, India has funded biotech research institutions but now sees that it needs to be going beyond and setting up companies, in public private partnership mode, to bolster biotechnology manufacturing.**
- **There are six verticals that this initiative envisages: bio-based chemicals and enzymes; functional foods and smart proteins; precision biotherapeutics; climate-resilient agriculture; carbon capture, and futuristic marine and space research.**
- **Futurists have been saying that the era of fossil-fuel industrialisation is over and humanity will have to rely on the natural world – for food and for making consumer products. This is to solve the global problem of non-biodegradable waste and carbon emissions.**

- **Future industries must be grounded in environmentally benign products, and this is impossible without sophisticated biotechnology.**
- **By setting up bio-foundries and bio-artificial intelligence hubs, the policy hopes there will be avenues for a variety of biotechnologists to congregate.**
- **Well intentioned this may be, but India's woes with manufacturing have chronic causes. Without establishing enabling grounds for longterm capital investment — and these have little to do with biotechnology per se — top-down initiatives will have limited impact**





Topic- Lateral entry → What is merit versus spoils system?

- **Merit system entails appointments to government posts after a rigorous selection process by an independent authority.**
- **In India, this commenced in the year 1858 when the British introduced the Indian Civil Service (ICS) to select officers for administering the country.**
- **After independence, the UPSC conducts exams to select officers for IAS, IPS and other central services.**
- **The merit system is aimed at building career bureaucrats who are expected to function without any political leanings and provide independent advice to the incumbent political executive.**
- **The spoils system on the other hand works on the adage ‘to the victor belong the spoils.’**



- **It is a system where the incumbent political executive appoints its supporters to various posts in the government.**
- **It has its origins in the U.S., and continued until 1883 when it was replaced largely by a merit system.**

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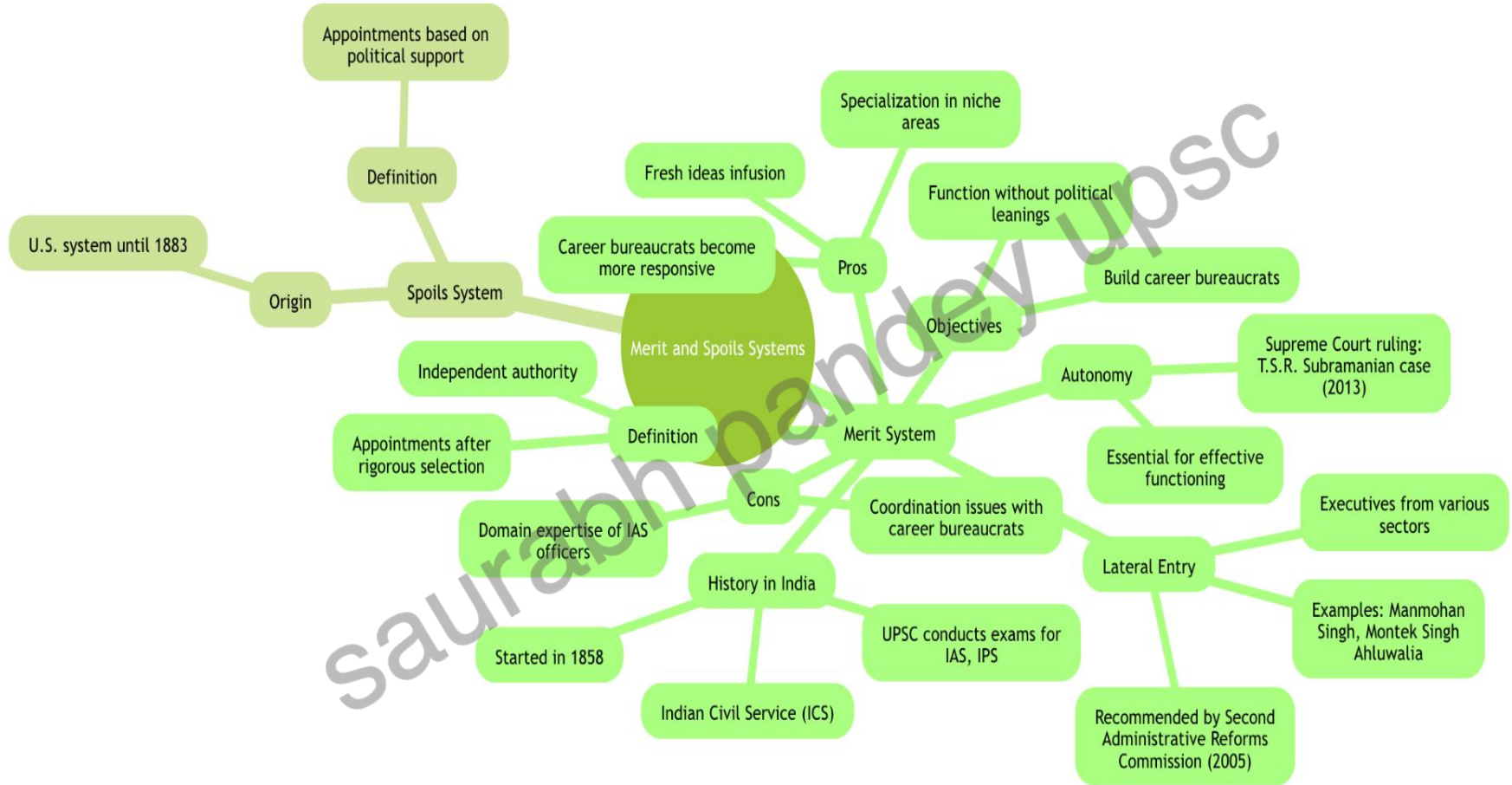
- **Lateral entry is when executives from the private sector, public sector undertakings and academia are appointed to senior and middle management positions in the government.**
- **There have been instances of lateral entrants who were technocrats being appointed at secretary level posts since independence.**
- **Notable examples include former Prime Minister Manmohan Singh, economist Montek Singh Ahluwalia, agriculture scientist M.S. Swaminathan etc.**
- **The Second Administrative Reforms Commission (2005) and the NITI Aayog in 2017 had also recommended lateral entrants to bring specialised knowledge and skills into governance**

What are the pros and cons?

- **Lateral entry brings with it certain tangible benefits.**
- **First, it brings much needed specialisation for niche areas of governance like emerging technologies, semiconductors, climate change, digital economy, cyber security etc.**
- **Second, it results in infusion of fresh ideas from experts to reinvigorate the system.**
- **Third, it also has the potential of making career bureaucrats more responsive thereby bringing in a positive change.**
- **However, it has its own set of significant limitations.**
- **The domain expertise and specialisation of IAS officers is their □ field experience that is hard to match by outside entrants.**
- **There can be coordination issues with career bureaucrats**



- **Autonomy of career bureaucrats is essential for their effective functioning.**
- **This includes reasonable independence with respect to postings, tenures and transfers. In this regard, as per Supreme Court judgment in the T.S.R. Subramanian case (2013), Civil Service Boards headed by top bureaucrats should be effectively constituted and strengthened at the Centre and States**



Topic- Why Fishes Died in Port of Volos, Greece



Overview

- **Recent event: Mass fish die-off at Port of Volos.**
- **Cause: Primarily attributed to extreme climate conditions.**
- Recent reports indicate over 100 tons of dead fish collected around the port, significantly impacting the local ecosystem and tourism.
- The situation has raised concerns about environmental health and climate change effects.



Causes of Fish Die-off

Extreme Weather Events:

- Heavy flooding in the region.
- Climate change exacerbating conditions.

Pollution:

- Potential contamination from nearby industrial activities.
- Nutrient runoff leading to algal blooms.

Oxygen Depletion:

- Sudden influx of water can lower oxygen levels, causing fish suffocation.

Temperature Changes:

- Rapid fluctuations in water temperature affecting fish survival rates.

Impact

Environmental:

Disruption of local marine ecosystems.

Potential loss of biodiversity.

Economic:

Negative effects on local fishing industry.

Decrease in tourism due to unpleasant conditions.

Social:

Community concerns regarding health and safety.

Public outcry for better environmental management.

Response Measures

Clean-Up Operations:

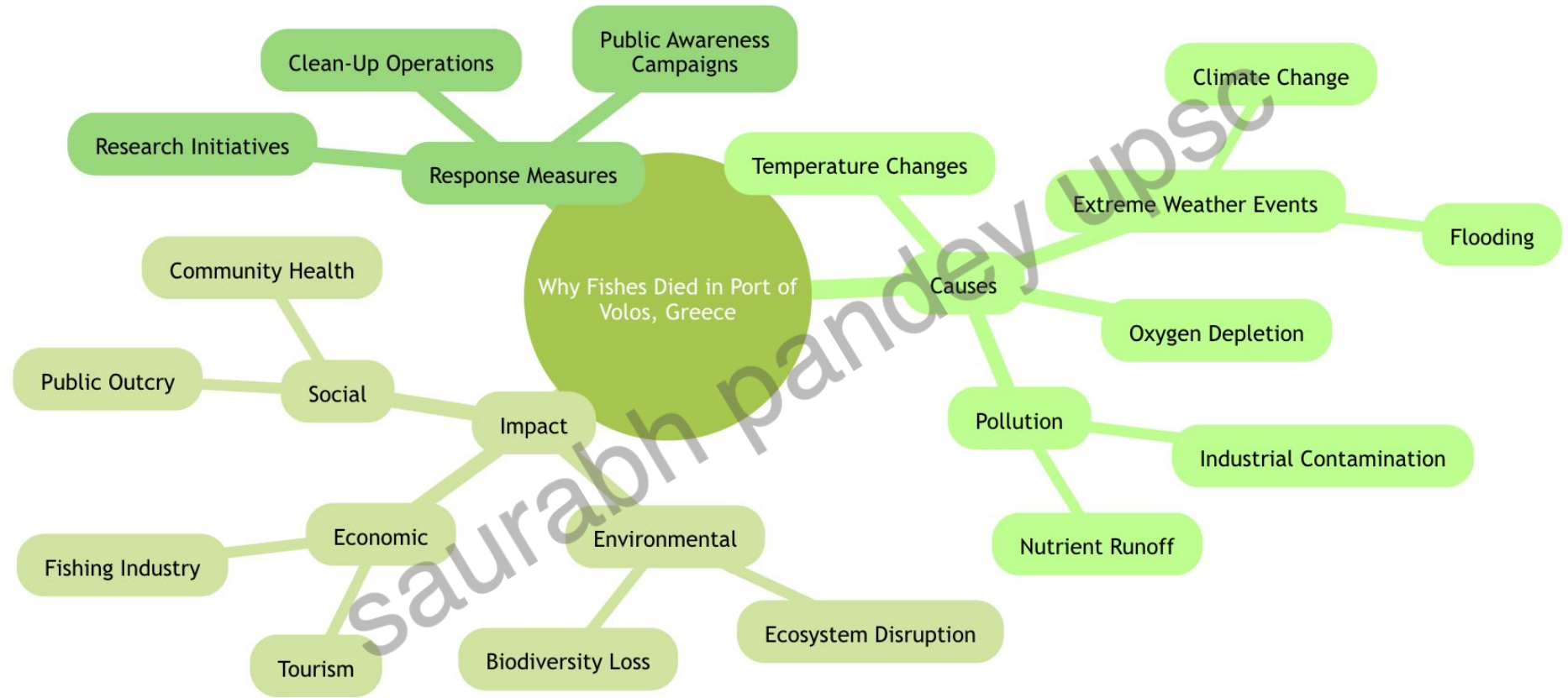
- Local authorities mobilizing resources for cleanup.
- Ongoing investigations into causes and remedies.

Research Initiatives:

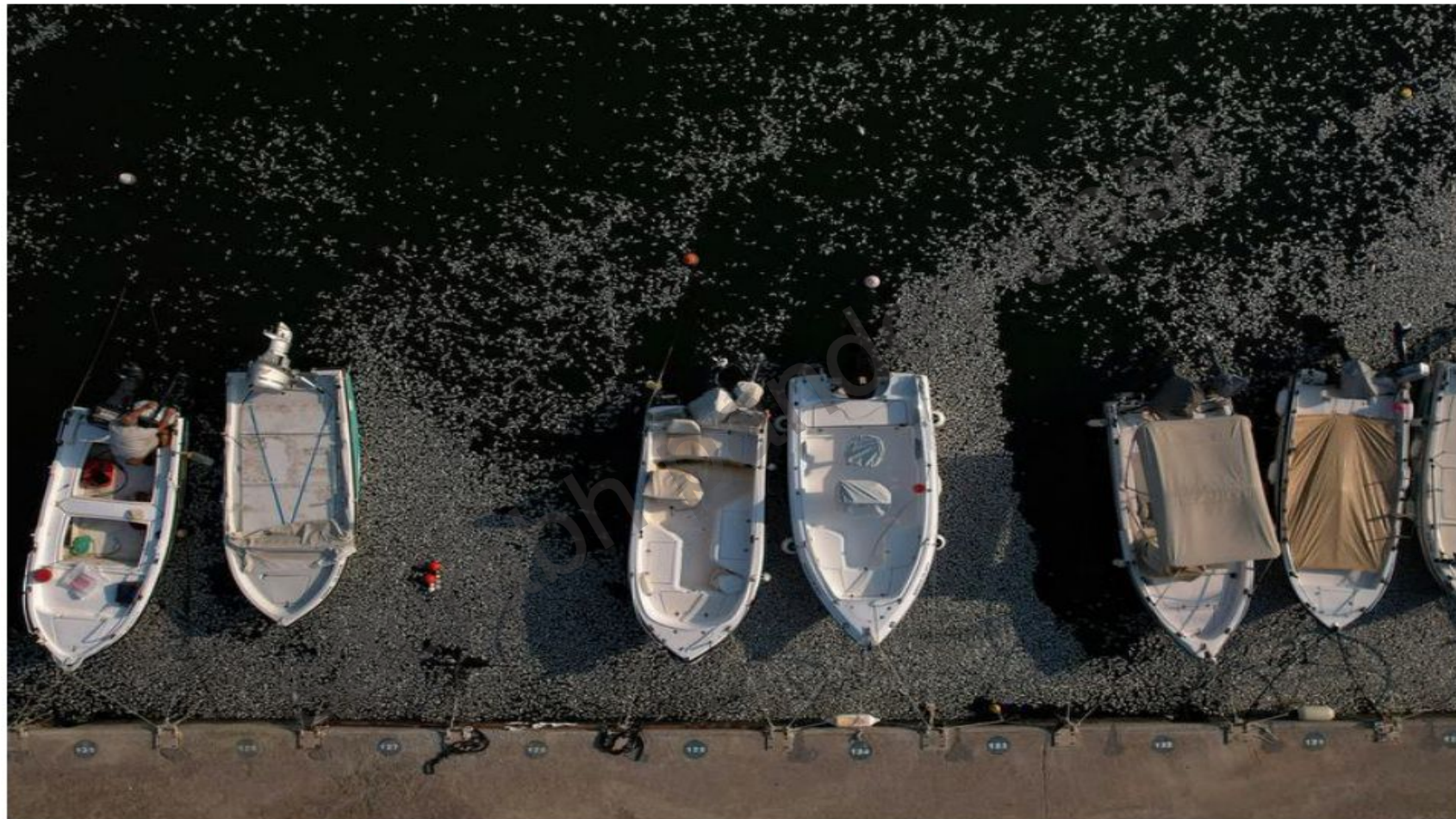
- Studies on long-term impacts of climate change on marine life.
- Monitoring water quality and fish populations.

Public Awareness Campaigns:

- Educating the community on environmental protection.
- Promoting sustainable fishing practices.



Climate catastrophe




Grim sight: Dead fish surround boats after washing up in tonnes in the port of Volos, Greece, on Wednesday following a mass die-off linked to extreme climate fluctuations. REUTERS

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